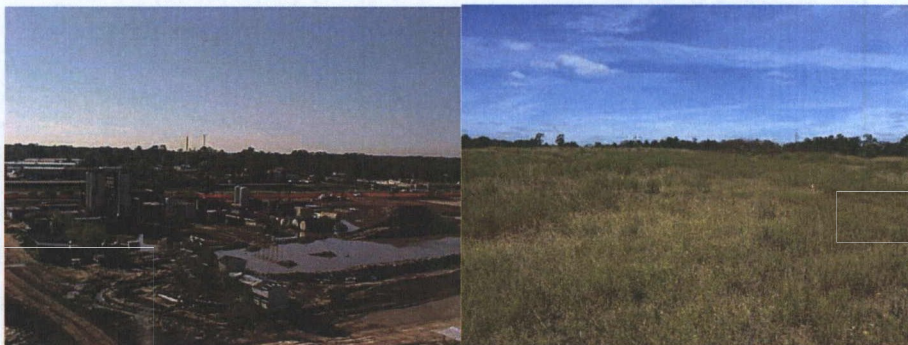


**THIRD FIVE-YEAR REVIEW REPORT FOR  
CONROE CREOSOTING COMPANY SUPERFUND SITE  
CONROE, MONTGOMERY COUNTY, TEXAS**



**JUNE 2018**



**2003**

**2017**

**Prepared by**

**U.S. Environmental Protection Agency  
Region 6  
Dallas, Texas**



100010626

**THIRD FIVE-YEAR REVIEW REPORT  
CONROE CREOSOTING COMPANY SUPERFUND SITE  
EPA ID#: TXD008091951  
CONROE, MONTGOMERY COUNTY, TEXAS**

This memorandum documents the U.S. Environmental Protection Agency's performance, determinations and approval of the Conroe Creosoting Company Superfund site (Site) third five-year review under Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S. Code Section 9621 (c), as provided in the attached Third Five-Year Review Report (FYR).

**Summary of the Third Five-Year Review Report**

This is the third FYR for the Conroe Creosoting Co. Superfund site. A wood-treating facility operated at the Site from 1946 to 1997. EPA conducted a time-critical removal action at the Site in 2002 and 2003. The removal action addressed surface media, including sediment in Stewart's Creek, and included construction of a Resource Conservation and Recovery Act (RCRA) vault to contain wastes. EPA selected a final remedy in a 2003 Record of Decision. The sitewide remedy includes monitored natural attenuation of groundwater, long-term maintenance of the RCRA vault, and implementation of institutional controls to restrict land use and control exposures. The remedy has been implemented. Groundwater monitoring and maintenance of the RCRA vault are currently ongoing. Groundwater contamination is contained within the site boundaries. Institutional controls are in place. There are currently no known exposures to contaminated groundwater.

**Environmental Indicators**

Human Exposure Status: Human exposures are under control.

Contaminated Groundwater Status: Groundwater migration is under control.

Sitewide Ready for Reuse: The Site achieved Sitewide Ready-for Anticipated Use status on January 7, 2013.

**Actions Needed**

The following actions must be taken for the remedy to be protective in the long term:

- Additional data collection is needed as part of the re-evaluation of the dioxin soil cleanup. It is currently unknown whether unacceptable exposure to dioxin exists on-site or in Stewarts Creek. Data from this sampling will be used to determine if residual soil dioxin levels are protective of human health based upon the new 2,3,7,8-tetrachlorodibenzo-p-dioxin RfD.

**Determination**

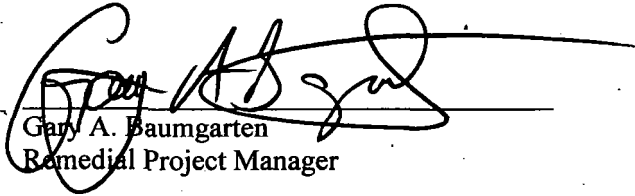
I have determined that the selected remedy for the Conroe Creosoting Company Superfund Site is protective in the short term. The remedy is considered protective because there are no on-site workers, thus there is no current on-site exposure. The recommendations and follow-up actions identified in this Five-Year Review should be addressed for long-term remedy protectiveness of human health and the environment.

for Ronald D. Edlund  
Carl E. Edlund, P.E.  
Director, Superfund Division  
U.S. Environmental Protection Agency, Region 6

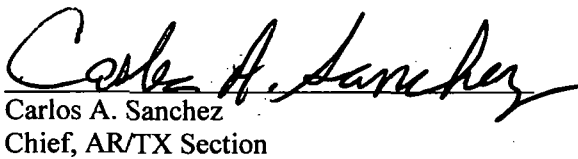
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CONCURRENCES

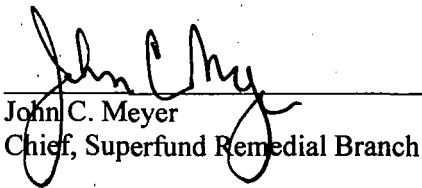
THIRD FIVE-YEAR REVIEW REPORT  
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EPA ID#: TXD008091951  
CONROE, MONTGOMERY COUNTY, TEXAS

  
Gary A. Baumgarten  
Remedial Project Manager

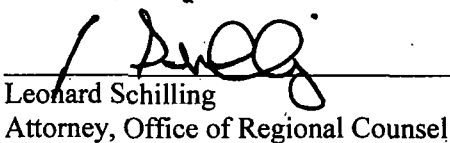
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Carlos A. Sanchez  
Chief, AR/TX Section

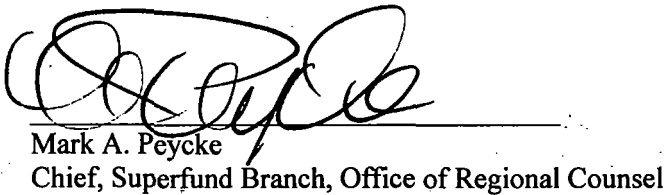
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John C. Meyer  
Chief, Superfund Remedial Branch

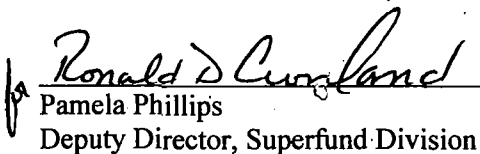
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Leonard Schilling  
Attorney, Office of Regional Counsel

6/28/18  
Date

  
Mark A. Peycke  
Chief, Superfund Branch, Office of Regional Counsel

07/02/18  
Date

  
Pamela Phillips  
Deputy Director, Superfund Division

7/10/18  
Date

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## ISSUES/RECOMMENDATIONS

### THIRD FIVE-YEAR REVIEW REPORT CONROE CREOSOTING COMPANY SUPERFUND SITE EPA ID#: TXD008091951 CONROE, MONTGOMERY COUNTY, TEXAS

#### Issues and Recommendations Identified in the FYR:

OU: Sitewide	<b>Issue Category: Remedy Performance</b>			
	<b>Issue:</b> The EPA released the final non-cancer dioxin reassessment publishing a non-cancer toxicity value, or reference dose (RfD), for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) in the Integrated Risk Information System (IRIS) in February of 2012. Following completion of the time critical removal action in 2003, confirmation samples were not analyzed for 2,3,7,8-TCDD. In addition, confirmation samples were not collected in excavated areas of Stewarts Creek. Therefore, there is no data available to compare residual soil exposure levels to the RfD.			
	<b>Recommendation:</b> Additional data collection is needed as part of the re-evaluation of the dioxin soil cleanup. It is currently unknown whether unacceptable exposure to dioxin would exist on-site for a future industrial land use scenario or in Stewarts Creek for an off-site residential visitor scenario. Data from this sampling will be used to determine if residual soil dioxin levels are protective of human health based upon the new 2,3,7,8-TCDD RfD.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party/Support Agency	Milestone Date
No	Yes	EPA	EPA/State	3/31/2021

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## LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
CCA	Copper Chromated Arsenate
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ESI	Expanded Site Inspection
FS	Feasibility Study
ft	Feet
FYR	Five-Year Review
HQ	Hazard Quotient
IC	Institutional Control
ISCO	In-Situ Chemical Oxidation
JHA	JHA Environmental Services, Inc.
LTRA	Long-Term Response Action
MCL	Maximum Contaminant Level
µg/L	Microgram per Liter
µg/kg	Microgram per Kilogram
mg/kg	Milligram per Kilogram
MNA	Monitored Natural Attenuation
NAPL	Non-Aqueous Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PCP	Pentachlorophenol
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SVOC	Semi-Volatile Organic Compound
TCEQ	Texas Commission on Environmental Quality
TCRA	Time-Critical Removal Action
UU/UE	Unlimited Use/Unrestricted Exposure
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound

## I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the third FYR for the Conroe Creosoting Company Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one sitewide operable unit (OU). The OU includes the Site's soil and groundwater remedy.

EPA remedial project manager (RPM) Gary Baumgarten led the FYR. Participants included Texas Commission on Environmental Quality (TCEQ) project manager Dee McCalley, and Ryan Burdge and Kelly MacDonald from EPA FYR contractor Skeo. EPA notified the relevant entities, including the property manager, of the initiation of the FYR. The review began on 10/4/2017.

### **Site Background**

The Site is a former wood-treating facility located at 1776 East Davis Street in Conroe, Montgomery County, Texas, about 40 miles north of Houston (Figure 1). Wood-treating operations took place at the 147-acre Site from 1946 to 1997. The facility treated lumber, railroad cross-ties, poles and fence posts using pentachlorophenol (PCP), creosote and copper chromated arsenate (CCA). Facility activities and waste management practices contaminated soil, sediment and groundwater with phenols, naphthalene, polycyclic aromatic hydrocarbons and PCP.

Site surroundings include residential property to the east, East Davis Street (State Highway 105) and industrial/commercial properties to the south, and forested land and commercial properties to the north and west. Little Caney Creek borders the Site to the east and Stewart's Creek borders the Site to the west. A pond (shown as a lake on site figures), which feeds Little Caney Creek, is located on the eastern portion of the Site.

The Site is currently undeveloped. A fenced Resource Conservation and Recovery Act (RCRA) vault, approximately 8 acres in size, is located on the northeast part of the Site. In 2011, East Davis Development acquired the site property except for the RCRA vault. Since then, the company has made road, utility and other improvements to prepare the area for reuse. Currently, about 140 acres are available for industrial redevelopment; parcels range in size from 5 acres to 50 acres. An unused on-site water supply well (State Well No. 60-45-555) is located near the center of the Site. The well's reported completion depth is 165 feet (ft) below ground surface (bgs).

Groundwater at the Site is present in two confined units of the Chicot Aquifer (the Sand-1 unit and the Sand-2 unit).<sup>1</sup> A silty clay ranging in thickness from 10 ft to 20 ft separates the Sand-1 unit from the deeper Sand-2 unit. Groundwater flow direction in both units is to the south-southwest. Groundwater contamination has been detected only in the Sand-1 unit and has not migrated off site. The Sand-1 unit is not a current source of drinking water. However, it has been a source of drinking water in the past and is considered a potential water supply.

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<sup>1</sup> Shallow Sand-1 unit wells at the Site are screened between 55 and 75 ft bgs. Deeper Sand-1 unit wells are screened between 95 and 118 ft bgs. Sand-2 unit wells are screened between 130 and 140 ft bgs.

Groundwater from the deeper Sand-2 unit, which is not affected by site contamination, is used as a potable water source near the Site. Private residences near the Site use private wells screened in the Sand-2 unit. The closest off-site water supply well is drilled to 385 ft bgs and is located southwest of the Site. Businesses and residences immediately downgradient of the Site are connected to the city of Conroe public water supply system, which obtains its water from supply wells located north and northwest (upgradient) of the Site, with the closest well located approximately 1 mile from the Site. The unused on-site supply well is installed in the Sand-2 unit.

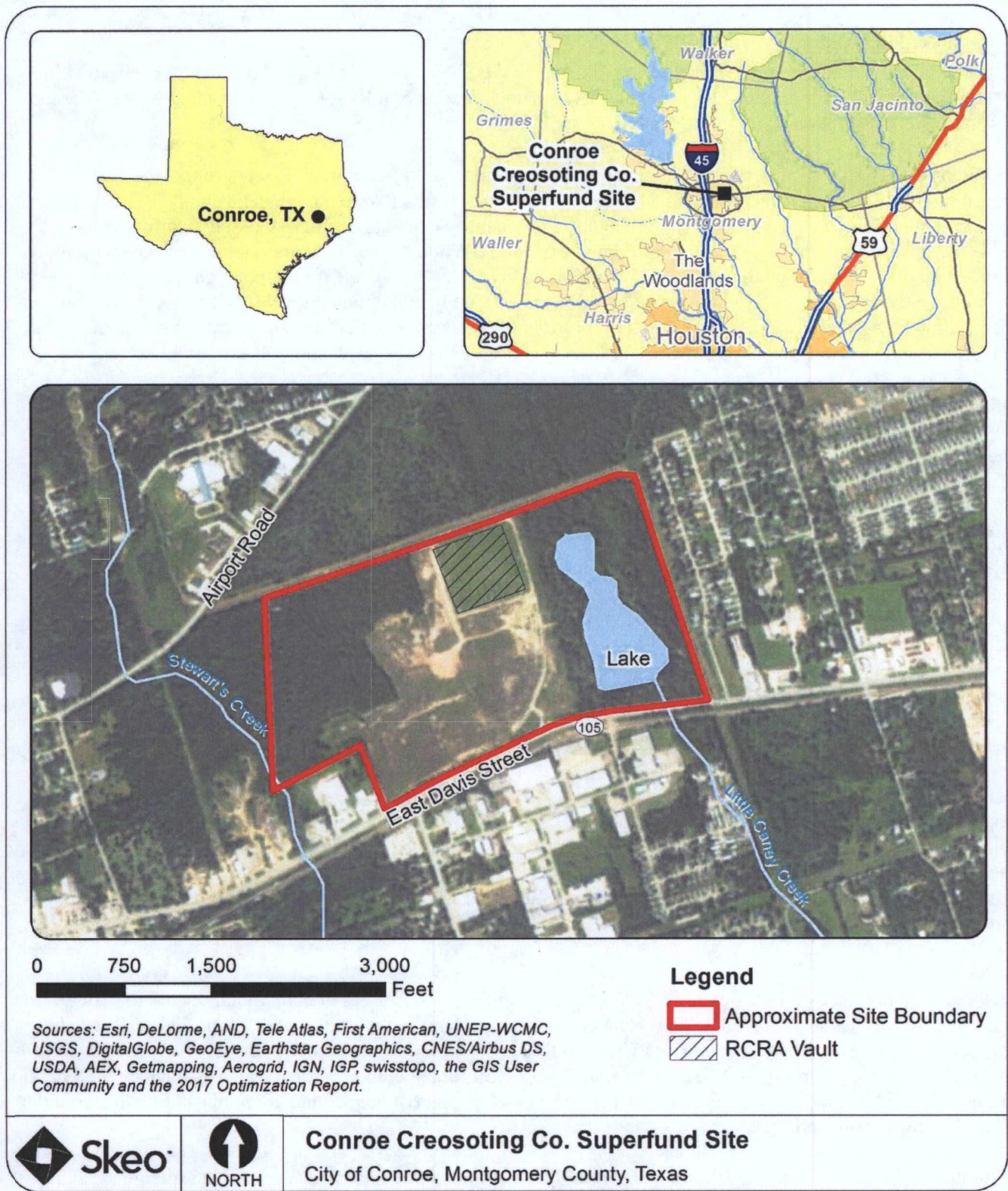
For reference, Appendix A includes a list of documents reviewed for this FYR. Appendix B provides a timeline of site events.

### **FIVE-YEAR REVIEW SUMMARY FORM**

<b>SITE IDENTIFICATION</b>	
<b>Site Name:</b> Conroe Creosoting Company	
<b>EPA ID:</b> TXD008091951	
<b>Region:</b> 6	<b>State:</b> Texas <b>City/County:</b> Conroe/Montgomery
<b>SITE STATUS</b>	
<b>NPL Status:</b> Final	
<b>Multiple OUs?</b> No	<b>Has the Site achieved construction completion?</b> Yes
<b>REVIEW STATUS</b>	
<b>Lead agency:</b> EPA	
<b>Author name:</b> Gary Baumgarten, with additional support provided by Skeo	
<b>Author affiliation:</b> EPA Region 6	
<b>Review period:</b> 10/4/2017 – 9/27/2018	
<b>Date of site inspection:</b> 10/19/2017	
<b>Type of review:</b> Statutory	
<b>Review number:</b> 3	
<b>Triggering action date:</b> 9/27/2013	
<b>Due date (five years after triggering action date):</b> 9/27/2018	



Figure 1: Site Vicinity Map



*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.



## II. RESPONSE ACTION SUMMARY

### **Basis for Taking Action**

EPA conducted a time-critical removal action (TCRA) at the Site between 2002 and 2003. The TCRA addressed surface media (soil, sediment and wastes) and included construction of a RCRA vault to contain wastes (see the Response Actions section for more information on the TCRA).

Following the TCRA, EPA conducted a remedial investigation to address remaining site groundwater contamination. The principal contaminants detected in the groundwater were naphthalene and PCP. EPA conducted a baseline risk assessment in 2003 but did not identify a human health risk based on a future site worker exposure scenario (via ingestion or dermal exposure). While neither PCP nor naphthalene concentrations in the groundwater exceeded the carcinogenic or non-carcinogenic risk levels for the potential exposure scenario at that time, the PCP concentration exceeded the federal maximum contaminant level (MCL) of 1 microgram per liter ( $\mu\text{g/L}$ ). EPA determined a remedial action for groundwater was necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The baseline risk assessment noted that there was little potential for significant exposure of wildlife to the contaminants because groundwater is not expected to discharge to any nearby surface water body.

### **Response Actions**

#### *Initial Response*

TCEQ and its predecessor agencies documented regulatory violations at the facility during compliance evaluations in the 1980s and early 1990s. As a result, the state issued Agreed Orders to Conroe Creosoting Company in 1994 and 1999. In March 1997, the Montgomery County Tax Assessor/Collector closed down the facility due to delinquent taxes, and wood-treating operations ceased.

JHA Environmental Services, Inc. (JHA) performed various investigations from September 1996 through June 2001. The investigations identified elevated levels of creosote compounds, arsenic and chromium in soil and shallow groundwater at the Site. JHA also conducted a waste inventory of the on-site tanks and cylinders.

During a March 2001 site inspection, TCEQ observed leaking containers at the Site. This led to an Expanded Site Inspection (ESI) in November 2001. ESI sampling results confirmed hazardous substances, including semi-volatile organic compounds (SVOCs), pesticides and inorganics in soil and sediment. The ESI report also documented an observed release of creosote from the Site into Stewart's Creek and the presence of an alleged waste burial area. Sampling results from private and municipal water wells tested during the ESI did not identify creosote compounds in the well water.

#### *Removal Action*

EPA conducted a removal assessment in 2002 to document potential sources of contamination and to better define the extent of affected surface media. The removal assessment identified various tanks, drums and surface water impoundments on site. EPA estimated that about 65,000 cubic yards of soil exceeded the EPA Region 6 screening guidance for arsenic, chromium, PCP, total creosote or dioxin/furan compounds. EPA also estimated that 540,000 gallons of liquid, sludge and contaminated water and 11,000 pounds of copper and ammonia sulfate in a granular form were located on site.

To protect public health and the environment from the most immediate threats at the Site, in September 2002, EPA began a TCRA. The TCRA included removal of all contaminated materials, soils, sediments and wastes from the Site, with placement in an on-site RCRA vault. EPA demolished buildings to remove contamination from within or under the buildings. Prior to placement in the RCRA vault, EPA solidified the liquids and materials from the tanks with fly ash and on-site soil. Concrete removed during the TCRA was used on site for

riprap or placed on top of existing concrete slabs. Scrap metal was stockpiled on site and eventually transported off site for recycling.

In 2003, EPA expanded the removal action to include Stewart's Creek. EPA excavated sediments from approximately 1,000 linear feet of the creek, from the probable point of entry into Stewart's Creek down to State Highway 105 (East Davis Street). EPA also removed sediments from approximately 1,500 linear feet of Stewart's Creek south of Highway 105. EPA transported the sediments back to the Site and disposed of them in the RCRA vault. A total of 252,000 cubic yards of contaminated material was eventually placed inside the vault.

EPA capped the waste in the vault with 12 inches of compacted clay, a set of liners (consisting of a geo-composite clay, high-density polyethylene liner, drainage net and geotextile fabric) and 12 inches of non-compacted clay. The final cover included 6 inches of topsoil with vegetative seed. EPA also constructed a leachate collection system. The primary leachate collection system consists of a 6-inch pipe with geotextile running diagonally across the length of the vault-type landfill cell. The secondary leachate collection system consists of a second piece of 6-inch pipe wrapped in geotextile fabric and placed in a gravel layer that covers the floor of the cell. The pipe runs diagonally across the length of the containment cell.

EPA and TCEQ conducted the Final Construction Inspection on September 22, 2003; they determined the TCRA was complete. EPA listed the Site on the Superfund National Priorities List (NPL) the same day.

#### *Remedy Selection*

EPA determined that the 2002-2003 TCRA adequately addressed contaminated soil, sediment and source areas at the Site. Between April and August 2003, EPA conducted a remedial investigation/feasibility study (RI/FS) to determine the nature and extent of groundwater contamination. Groundwater contamination was detected only in the Sand-1 unit.

In September 2003, EPA issued a Record of Decision (ROD) to address remaining site risk posed by contaminated groundwater.

The 2003 ROD summarized the remedial action objectives (RAOs) addressed by the 2002-2003 TCRA:

- Prevent direct contact, ingestion and inhalation of surface and subsurface soils that exceed human health-based levels for the chemicals of concern.
- Prevent direct contact, ingestion and inhalation of sediments in the drainage areas and creek that exceed human and ecological based levels for the chemicals of concern.
- Prevent the release of contaminants to surface and subsurface soils, surface water and groundwater.
- Protect off-site ecological receptors by preventing off-site contaminant migration as a result of on-site releases.

The 2003 ROD also identified the following sitewide RAOs:

- Minimize further migration of the contaminant plume in the Sand-1 aquifer and prevent migration of contaminants to the Sand-2 aquifer.
- Restore groundwater throughout the contaminant plume to its expected beneficial uses wherever practicable. This objective will require a much longer timeframe to achieve, with an optimum period of 10 years. However, it may take up to 20 years.

The final remedy selected in the 2003 ROD included monitored natural attenuation (MNA) of groundwater, long-term maintenance of the RCRA vault, and institutional controls to prevent future installation of water supply wells and restrict future development of the Site to non-residential uses. The 2003 ROD selected no further action for on-site soils and off-site sediment.

The 2003 ROD also included contingency measures for groundwater if natural attenuation could not attain cleanup goals. Contingency measures would include the use of an oxygen (either air or a liquid additive) or nutrient delivery system to enhance the natural degradation of PCP. The delivery system would use existing monitoring wells or specific injection wells to deliver the additives to the Sand-1 unit. One or more criteria may be used to trigger the contingency remedy, including:

- Contaminant concentrations are not decreasing at a sufficiently rapid rate to meet the remediation objectives.
- Contaminant concentrations in groundwater at specified locations exhibit an increasing trend not originally predicted during remedy selection.

The ROD identified the remedial goal for PCP in groundwater as 1 µg/L based on the MCL established under the federal Safe Drinking Water Act. Remedial goals were not established for other chemicals, including naphthalene, because concentrations in groundwater did not exceed carcinogenic or non-carcinogenic risk levels for potential exposure scenarios at that time.

### **Status of Implementation**

EPA contractors had installed a groundwater monitoring network for the MNA remedy prior to the 2003 ROD (Figure 2). The monitoring network consisted of 21 wells in the Sand-1 unit and three wells in the Sand-2 unit. Since no further remedial construction activities were planned for the Site, EPA signed the Preliminary Close-Out Report for the Site on the same day EPA issued the ROD, on September 29, 2003.

Groundwater sampling events for the MNA remedy took place at the Site between May 2003 and February 2006. Based on continued detections of PCP above the MCL, EPA decided to implement contingency measures, which included the addition of oxidant near the impacted wells (well clusters MW-8 and MW-10). EPA conducted in-situ chemical oxidation (ISCO) pilot tests in September 2006 and June 2008. ISCO was unsuccessful in lowering PCP concentrations to below the MCL. ISCO was not carried forward as a remedy.

Several wells have been plugged and abandoned since 2008, including MW-15A.<sup>2</sup> Although MW-15A reported the highest concentrations of PCP in groundwater at the Site, it was suspected of acting as a conduit for transport of contamination into the deeper groundwater.<sup>3</sup> Most wells were abandoned because EPA determined that they no longer required monitoring. The wells that were abandoned either displayed low-to-non-detectable site-related contaminants or were in upgradient to sidegradient positions in relation to the remaining on-site contaminant plume. Replacement wells were installed for some wells in important monitoring locations.

Between July and October 2012, TCEQ's contractor made repairs to the RCRA vault, which had deteriorated significantly since its construction. Repair work included removal of vegetation from the cap, regrading of the side slopes, placement of diversion berms/dropdown structures, placement of additional select fill and organic topsoil, and seeding and watering to reestablish vegetation.

In 2014, EPA completed an evaluation to determine if MNA was functioning as intended. The evaluation concluded that the MNA remedy at the Site was functioning and achieving its RAO, but at rates somewhat less than originally anticipated. Results of the evaluation were presented in a Technical Memorandum on Performance Assessment of Natural Attenuation Remedy, dated November 2014.

In 2015, EPA completed an optimization review to identify opportunities for improvement of the Site's remedy. The review concluded that the primary sources of contamination have been removed or controlled. However, affected groundwater may not be completely delineated along the southern boundary of the Site and the long-term

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<sup>2</sup> Plugged and abandoned wells include MW-8A, MW-10A, MW-10B, MW-15A, MW-16B, MW-1A, MW-1B, MW-2A, MW-2B, MW-3A, MW-3B, MW-4A, MW-4B, MW-7A, MW-7B, MW-9A and MW-9B.

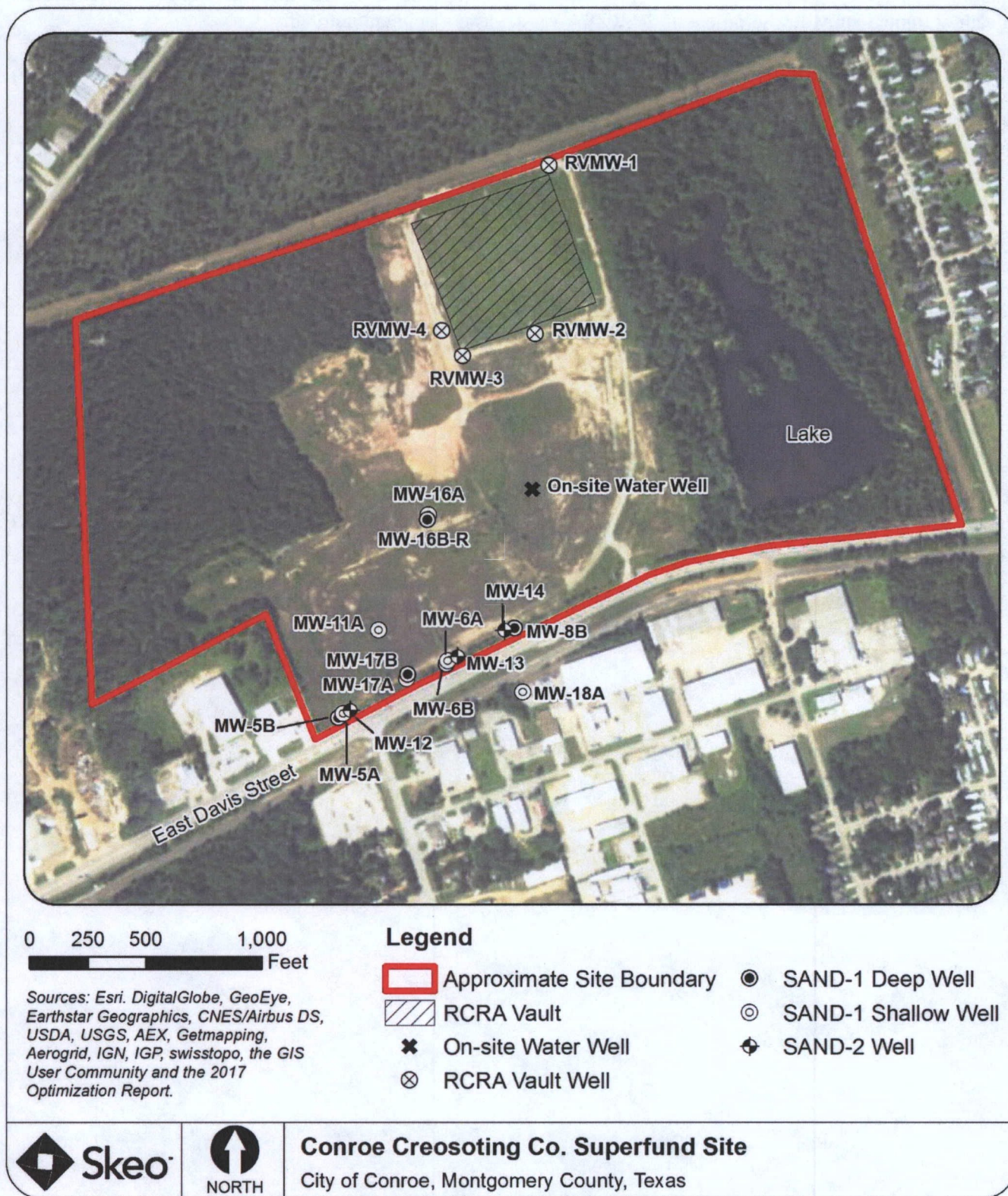
<sup>3</sup> Sand-1 deep well MW-8B and Sand-2 well MW-14 are located in the former location of MW-15A and monitor the deeper aquifer units in this location. MW-18A is a Sand-1 shallow well downgradient of the former location of MW-15A.

effect of secondary sources, specifically contaminants of concern (COCs) in residual subsurface soil contamination and COCs diffused into low-permeability units have not been quantified. In addition, groundwater beneath or immediately downgradient of the RCRA vault was not being monitored.

EPA's contractor implemented recommendations from the optimization review in February and March 2017. The work included installation of three soil borings near former well MW-15A, installation of two monitoring wells along the south perimeter of the site (MW-17A and MW-17B), installation of a monitoring well south of the Site boundary (downgradient) of the Site (MW-18A), collection and analysis of soil samples and soil cores from the newly installed soil borings and monitoring well boreholes, and collection and analysis of groundwater samples from the new and existing monitoring wells. EPA's contractor also installed four monitoring wells around the perimeter of the site's RCRA vault (RVMW-1 through RVMW-4). The Optimization Investigation Report, dated June 2017, presents the results of the additional field work and evaluation.



Figure 2: Site Map



*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

### **Institutional Control (IC) Review**

On July 30, 2010, Conroe Creosoting Company and EPA executed an Environmental Protection Easement and Declaration of Restrictive Covenants for the site property. The document was filed with the Montgomery County Clerk's office on March 25, 2011, as document number 201102560. The document set forth the following restrictions on use:

- Prohibits the installation of water wells at the Site. The restrictions prevent the use of the Sand-1 aquifer until the remedial goals have been attained and the installation of wells within the former process and disposal areas to prevent the downward movement of creosote and PCP during the well installation process.
- Prohibits the removal of vegetation from the landfill cover, if such removal may result in the subsequent erosion or removal of the soil cover over the landfill or treated material.
- Prohibits the excavation or trenching into the RCRA landfill contents or the associated soil cover.
- Restricts future redevelopment of the property to non-residential use.
- Requires notification to any future land owners that the land was a former Superfund site and hazardous substances remaining on-site in the groundwater are above health-based concentration levels.

Groundwater contamination remains within the Site boundaries, as discussed further in Section IV of this FYR.

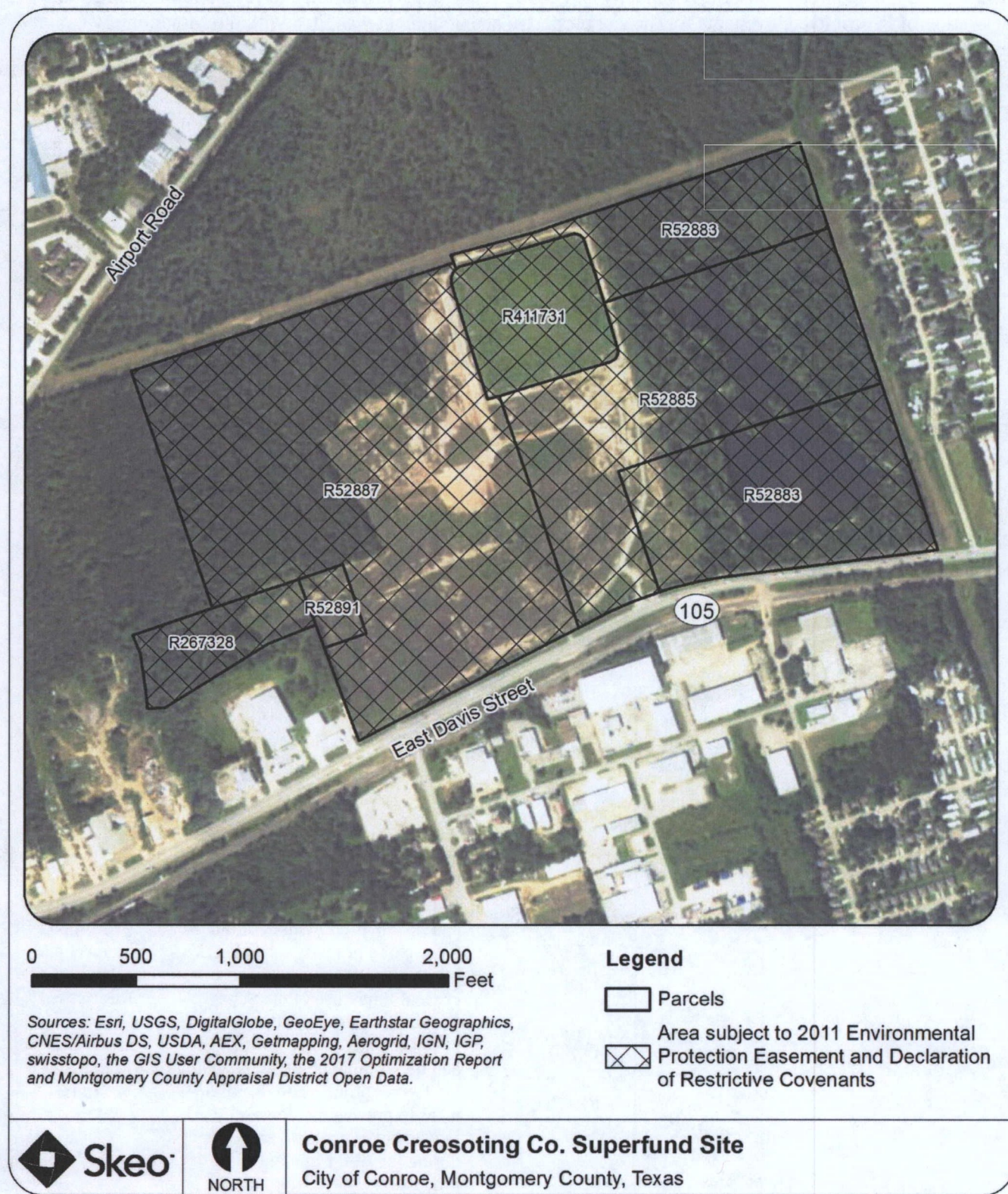
Table 1 summarizes the institutional controls for the Site, including the institutional control objectives as originally specified in the ROD. The implemented institutional control satisfies the ROD institutional control objectives. Figure 3 identifies the areas subject to the Environmental Protection Easement and Declaration of Restrictive Covenants. Appendix C includes a copy of the recorded Environmental Protection Easement and Declaration of Restrictive Covenants.

**Table 1: Summary of Institutional Controls (ICs)**

<b>Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions</b>	<b>ICs Needed</b>	<b>ICs Called for in the Decision Documents</b>	<b>Impacted Parcel(s)</b>	<b>IC Objectives</b>	<b>Title of IC Instrument Implemented and Date</b>
Soil, groundwater, RCRA vault	Yes	Yes	Former Conroe Creosoting property, 149.227 acres in the Lemuel Smith Survey, A-526, Montgomery County, Texas <sup>a</sup>	Prevent exposure to contaminated groundwater above acceptable risk levels during the remedial action activities; limit access to the Site and potential future uses through the use of a property easement or other restrictive mechanisms; prevent future use of the Sand-1 aquifer until the remedial goals have been attained across the Site and the installation of wells within the former process and disposal areas to prevent the downward movement of creosote and PCP during the well installation process.	Environmental Protection Easement and Declaration of Restrictive Covenants, recorded March 25, 2011
<b>Notes:</b> a) Exhibit A of the Environmental Protection Easement and Declaration of Restrictive Covenants provides a legal description of the land.					



**Figure 3: Institutional Control Map**





### **Systems Operations/Operation and Maintenance (O&M)**

TCEQ is responsible for O&M of the RCRA vault and monitoring groundwater at the Site. In a letter dated November 2, 2017, EPA notified TCEQ that EPA intended to transfer responsibility for the selected remedy at the Site to TCEQ.

#### ***RCRA Vault O&M***

TCEQ contractors conduct O&M of the RCRA vault in accordance with the April 2013 Final Operations and Maintenance Manual (O&M Manual). During semi-annual inspections, TCEQ contractors evaluate the condition of signs, access roads, fencing, the RCRA vault cover system and drainage features, and identify and implement corrective actions when necessary. During this FYR period, minor corrective actions at the Site's RCRA vault included repairs to the RCRA cell lock and gate in response to a trespassing issue, clearing of drainage downspouts and leachate collection system risers, and replacement of weathered or broken TCEQ warning signs around the RCRA cell.

During each inspection, TCEQ contractors also evaluate the leachate collection system and leachate detection system for the presence of leachate in the RCRA vault. If leachate is present, the height of leachate is recorded. The O&M Manual states that if leachate is present, leachate samples are to be collected and analyzed for VOCs, SVOCs, metals and several screening parameters. A leachate sample collected in January 2014 reported arsenic, carbazole, bis(2-chloroethyl)ether and chloride at concentrations above the TCEQ Tier 1 Residential Groundwater Protective Concentration Levels.

Leachate recovery was performed in December 2014. The volume recovered during the month-long process was 47,600 gallons. This was significantly less than estimates based on leachate level measurements. Since the Conroe RCRA landfill does not include a recovery system, the criteria for removal in the O&M Plan may not be a practical indicator for recoverable leachate. The TCEQ will continue to monitor leachate levels and remove leachate as necessary.

TCEQ is responsible for sampling and analysis of the four RCRA vault monitoring wells installed by EPA in 2017. The first sampling event is expected to occur in fiscal year 2018.

#### ***LTRA Monitoring***

In 2005, EPA implemented the LTRA program at the Site.

The ROD called for annual groundwater monitoring. During this FYR period, groundwater sampling occurred in January and December 2013, July 2014 and February 2017.

EPA currently samples 14 monitoring wells for PCP, naphthalene and other SVOCs (Figure 2):

- Shallow Sand-1 unit wells MW-5A, MW-6A, MW-11A, MW-16A, MW-17A and MW-18A.
- Deep Sand-1 unit wells MW-5B, MW-6B, MW-8B, MW-16B-R and MW-17B.
- Sand-2 unit wells MW-12, MW-13 and MW-14.

The 2017 Optimization Investigation Report recommended sampling new wells MW-17A, MW-17B and MW-18A semi-annually for a period of two years to establish baseline groundwater quality conditions and sampling the remaining 11 wells annually. All of the wells should be gauged for groundwater level elevations during the two years of semi-annual sampling, and groundwater flow direction should be determined for every groundwater monitoring event. After two years of semi-annual data collection for the new wells, the groundwater monitoring frequency can be reduced to annual monitoring events for the full groundwater monitoring network.

The ROD estimated annual O&M costs for the groundwater monitoring program of \$48,000 for years three through five and \$23,000 for years six through 20. The ROD did not estimate O&M costs for the RCRA vault. During the current FYR period, average annual O&M costs for groundwater monitoring and performing other activities required for maintaining the groundwater monitoring network were approximately \$25,000. This cost is

within the estimated expenditure range listed in the ROD. Annual O&M costs for the RCRA vault were unavailable.

Annual O&M costs of the RCRA vault over the previous 12 years has averaged \$132,800. The cap repair costs were \$840,000 in FY2012 and leachate removal was \$400,000 in FY2015. If cap repair costs are removed, the average annual cost of routine RCRA vault O&M is \$63,000. The leachate recovery accounts for over 50% of actual costs for TCEQ at the site.

### III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determination and statement from the 2013 FYR Report (Table 2) as well as the issues and recommendations from the 2013 FYR Report and the status of those recommendations (Table 3).

**Table 2: Protectiveness Determination/Statement from the 2013 FYR**

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	The remedy for the on-site soils and off-site sediments at the Conroe site is protective of human health and the environment because the waste has been removed or contained. The remedy for groundwater is protective of human health and the environment in the short term because there is no evidence that there is current exposure, and the remedy is being implemented as planned to reduce the volume of contamination and to control migration. Ongoing O&M activities for the RCRA vault and continued groundwater monitoring will allow verification that the migration of contamination continues to be controlled. Because the completed remedial action and monitoring program for the Conroe site are protective in the short term, the remedy for the site is protective of human health and the environment, and will continue to be protective, if the action items identified in this report are addressed.

**Table 3: Status of Recommendations from the 2013 FYR**

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
Sitewide	The vegetative cover has not re-established as intended following the 2012 repairs, making the cap prone to future erosion.	Remove any seedlings that could develop into woody vegetation and establish a grass cover on the cap as part of O&M activities.	Completed	TCEQ contractors remove any seedlings as part of regular O&M of the RCRA vault. During the FYR site inspection, the cap was well vegetated.	1/29/2014

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
Sitewide	Leachate accumulation in the RCRA vault has not been monitored or managed on a regular basis.	Leachate accumulation in the RCRA vault should be monitored and characterized on a regular basis as part of O&M activities. As necessary, disposition of this fluid should be conducted to ensure the vault continues to function as intended.	Ongoing	TCEQ monitors leachate semi-annually. In December 2014 and January 2015, TCEQ contractors pumped 47,600 gallons of water (leachate) from the leachate collection system, treated it and sprinkled the treated water back onto the landfill. Leachate heights above one foot (the trigger for removal as specified in the O&M Manual) continue to be measured. However, further leachate removal has not occurred.	N/A
Sitewide	Monitoring wells MW-16A and MW-16B-R have flush-mounted surface completions, making them prone to damage from ongoing property improvements by the current property owner.	Install temporary bollards or other forms of markers that clearly denote the locations of these wells while construction activities are proceeding. These bollards/markers should be installed in such a way that allows them to be removed so that the flush-mounted well pads can be integrated into planned pavement and/or landscaping without impeding the continued development of the property.	Considered But Not Implemented  The issue was determined to not affect protectiveness of the remedy.	Monitoring wells MW-16A and MW-16B-R had flush-mounted surface completions during the FYR site inspection. Temporary bollards or other markers were not observed. Care will be taken during redevelopment to maintain the integrity of existing wells or additional measures will be implemented to ensure the monitoring network is adequate.	N/A
Sitewide	A portion of the monitoring well monuments were noted to contain locks, but were unlocked at the time of the site inspection.	Ensure the monitoring well monuments are locked when the wells are not in use for groundwater monitoring activities.	Completed	EPA contractors secured the wells following a subsequent sampling event.	12/13/2013

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
Sitewide	TCEQ provided comments regarding current monitoring well locations and parameters being monitored.	Continue monitoring groundwater quality using the existing groundwater monitoring well network. If gathered data indicates a deterioration in groundwater quality associated with downgradient sentinel wells for the Sand-1 aquifer (MW-5A, MW-5B, MW-6A, MW-6B and MW-8B) and/or the Sand-2 aquifer (MW-12, MW-13 and MW-14), steps should be taken to evaluate the current monitoring well locations, and install additional monitoring wells. The groundwater monitoring program should be expanded to evaluate MNA performance. As part of this process, MNA parameters should be added for groundwater samples collected from MW-11A, MW-16A and MW-16B-R to evaluate the effectiveness of biodegradation within the contaminant plume. These MNA parameters should be collected on an annual basis for the first two years proceeding completion of this FYR. In addition, EPA and TCEQ will evaluate existing data to determine if additional groundwater characterization of the shallow Sand-1 aquifer is necessary to determine whether migration to off-site properties is occurring and install additional monitoring wells as needed. This will ensure the contaminant plume remains delineated and the remedy is functioning as intended.	Completed	<p>EPA completed an MNA evaluation in November 2014. The evaluation concluded that the MNA remedy at the Site appears to be functioning and achieving its RAO, but at rates somewhat less than originally anticipated. The evaluation also concluded that MNA continues to be a viable component for the overall remedial strategy, and is an integral piece of the overall site remedy.</p> <p>In response to concerns regarding groundwater plume delineation and whether the remedy is functioning as intended a remedy optimization review was conducted between 2014 and 2015. Based on recommendations in the Optimization Report, EPA conducted an optimization investigation in 2017. A report documenting the findings was completed in June 2017.</p>	11/1/2014

#### IV. FIVE-YEAR REVIEW PROCESS

##### Community Notification, Community Involvement and Site Interviews

EPA published a public notice in the *Conroe Courier* on 10/18/2017. It stated that the FYR was underway and invited the public to submit any comments to EPA. The results of the review and the report will be made available

at the Site's information repository, the Montgomery County Memorial Library, located at 104 Interstate 45 North in North Conroe, Texas. Appendix D includes a copy of this notice.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy implemented to date. The interviews are summarized below. Appendix E includes the completed interview summary forms.

TCEQ project manager Dee McCalley indicated the RCRA landfill is in good shape, with vegetation covering most of the top of the landfill. She noted that the remedy appears to be functioning as designed. However, data is pending on the recently installed wells surrounding the landfill. An initial sampling event of the wells will be scheduled during fiscal year 2018 to establish a baseline. TCEQ intends to use the data to monitor the integrity of the landfill.

Ms. McCalley also noted that data from the existing well network indicate that the plume in the Sand-1 unit is delineated to the south and there are no indications of contamination off site. As noted in the previous FYR report, many of the excavation areas around the former process areas do not have monitoring wells, particularly in the deeper groundwater unit (Sand-2). Ms. McCalley is comfortable with the status of institutional controls at the Site and is unaware of any changes in projected land use.

The property owner's agent indicated that there are no known effects of the Site on the surrounding community. He is also unaware of complaints or inquiries about the Site. The property owner's agent is well informed about site remedial activities. He noted that the city of Conroe plans to extend a major thoroughfare from the intersection of FM 1314 and State Highway 105 to Airport Road. The new road will cross the Site on its west end. The right-of-way may be dedicated as public use with public utilities.

### **Data Review**

This FYR evaluates groundwater data from January and December 2013, July 2014, and February 2017 sampling events, as originally presented in LTRA technical memoranda, dated March 2013, February 2014 and September 2014, as well as the June 2017 Optimization Investigation Report.

### **Groundwater**

The ROD identified PCP and naphthalene as primary groundwater COCs; however, it only established a groundwater cleanup goal for PCP (the MCL of 1 µg/L) since there was no risk identified for naphthalene or other groundwater COCs. For this data evaluation, concentrations of PCP and naphthalene were compared to MCLs, where available. In the absence of an MCL, EPA's tapwater regional screening levels (RSLs) were used as the comparison value.

During this FYR period PCP and naphthalene were detected in groundwater above the MCL or RSL in only three wells: Sand-1 unit shallow wells MW-11A and MW-16A and Sand-1 unit deep well MW-16B-R.

The extent of groundwater contamination is limited to wells MW-11A, MW-16A and MW-16B-R, located on the southern part of the Site (Figure 2). PCP and naphthalene were not detected above reporting limits in downgradient boundary wells MW-5A, MW-6A, MW-17A and MW-17B or off-site well MW-18A during the 2017 sampling event. Additionally, PCP and naphthalene have not been detected in the Sand-2 unit wells. The results from these wells demonstrate that PCP and naphthalene groundwater contamination remains on site and is limited to the Sand-1 unit. Table 4 summarizes PCP and naphthalene concentrations in wells MW-11A, MW-16A and MW-16B-R during the FYR period. The highest naphthalene concentrations were observed in MW-11A, which is downgradient from a former waste pit and drainage ditch. Table F-1 in Appendix F presents PCP and naphthalene concentrations in all wells from 2005 through 2017.

**Table 4: Naphthalene and PCP in Select Wells, 2013 to 2017**

Monitoring Well	Naphthalene (µg/L) EPA RSL = 6.1 µg/L				PCP (µg/L) MCL = 1 µg/L			
	Jan. 2013	Dec. 2013	Jul. 2014	Feb. 2017	Jan. 2013	Dec. 2013	Jul. 2014	Feb. 2017
<b>Sand-1 Unit Shallow Monitoring Wells</b>								
MW-11A	3,740	3,970	2,020	2,790/ 2,720	39.2/ 43.0	66.1	68.1	12.4/10.4
MW-16A	0.5 U	2.8	0.7	0.0956 U	1.8	4.2	6.8	14.1
<b>Sand-1 Unit Deep Monitoring Well</b>								
MW-16B-R	0.5 U	1.3	0.7	0.0962 U	4.0	5.5	7.3	40.3
<b>Notes:</b> U = not detected at the reported quantitation limit. xx/xx = primary and duplicate sample result reported. <b>Bold value</b> indicates the detected concentration exceeds the EPA RSL (for naphthalene) or the MCL (for PCP).								

The 2017 Optimization Investigation Report included trend graphs for PCP and naphthalene in wells MW-11A and MW-16A in the Sand-1 unit shallow zone and for MW-16B-R in the Sand-1 unit deep zone. These graphs are included as Figures F-2 through F-4 in Appendix F of this FYR Report. The graphs show an overall decrease in PCP and naphthalene concentrations in MW-11A and MW-16A, with the trend lines for PCP and naphthalene in MW-11A, and naphthalene in MW-16A displaying peaks in 2010 and 2011, and decreasing trend lines for these compounds thereafter. For PCP in MW-16A, the trend line displays an overall decreasing trend for this compound since 2005, although Table 4 shows increasing concentrations since 2013. The trend graphs for MW-16B-R show an overall decrease in naphthalene concentrations in this well, with the trend line for naphthalene displaying a peak in 2011 and 2012. The trend graph for PCP in MW-16B-R indicates a decreasing trend for the compound until December 2013, when concentrations began to increase. Monitoring wells MW-16A and MW-16B-R and downgradient wells will continue to be monitored to evaluate contaminant trends and monitor plume migration in the Sand-1 unit.

### *Soil*

In February 2017, EPA installed three soil borings (TASB-1, TASB-2 and TASB-3) near well MW-8B (and former well MW-15A) to 40 feet bgs. Multiple soil samples were collected from each boring and analyzed for SVOCs to identify residual contamination in subsurface soils that may be leaching to groundwater. None of the soil samples screened in the field indicated the presence of NAPL. EPA also collected soil samples during installation of new monitoring wells MW-17A, MW-17B and MW-18A.

Intrinsic permeability values for soil samples collected from the soil boring collected during the optimization investigation ranged from  $1.04 \times 10^{-13}$  to  $2.9 \times 10^{-13}$ . These values are consistent with relatively impermeable clays, which have been observed to make up much of the site's subsurface above the Sand-1 aquifer. This data also supports conditions favorable for relatively slow vertical migration of site COCs through these units, and supports the observations that have been made where a large portion of the residual mass is associated with the upper 20 to 30 ft of the subsurface, with lower concentrations being observed at deeper depths.

Based on the results of the Oil-In-Soil™ test kits, the presence of hydrocarbons was indicated in the soil samples collected, but the test kits did not indicate the presence NAPL-saturated soil in these soil samples.

### **Site Inspection**

The site inspection took place on 10/19/2017. Participants included EPA RPM Gary Baumgarten, TCEQ project manager Dee McCalley, property manager Matt Marquis, and Ryan Burdge and Kelly MacDonald from EPA FYR support contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. Appendix G includes the site inspection checklist. Appendix H includes photographs from the site inspection.

The site inspection indicated the RCRA vault, and its related benches and letdown channels, were in good condition, with no major settlement, erosion or other signs of degradation. No issues were noted with the physical condition of the RCRA vault's leachate recovery well. The security fence along the perimeter of the RCRA vault

was noted to be in overall good condition, with locked access gates and posted warning signs secured to the fence. An access gate lock was rusty and may need to be replaced.

Inspection of the Site's groundwater monitoring well network indicated that the wells were in good condition. Some of the well monuments used to protect/secure the wells were observed to contain locks, but the locks had not been re-secured since the previous groundwater monitoring event, which occurred in early 2017. Closer inspection of these wells indicated the well caps were still secure, with no indication of tampering or vandalism. Additionally, monitoring wells MW-16A and MW-16B-R have flush-mounted surface completions, and evidence of earthwork was observed near these wells, which was associated with the planned development of the property as an industrial park.

Following the site inspection Skeo personnel visited the site's information repository, the Montgomery County Memorial Library. No site documents were available for review.

## **V. TECHNICAL ASSESSMENT**

**QUESTION A:** Is the remedy functioning as intended by the decision documents?

### **Question A Summary:**

Yes, the remedy is functioning as intended by the decision document. The TCRA removed contaminated materials, soils, and wastes from the Site and sediments from Stewart's Creek and placed them in an on-site RCRA vault. Subsurface soil contamination identified during the 2017 Optimization Investigation does not appear to be mobile based on intrinsic permeability testing and does not indicate the presence of NAPL.

The final remedy included groundwater MNA, long-term maintenance of the RCRA vault and institutional controls. The extent of groundwater contamination, primarily PCP and naphthalene, is limited to wells MW-11A, MW-16A and MW-16B-R, located on the southern part of the Site. A 2014 MNA evaluation found that natural attenuation of the plume associated with these wells is occurring and achieving the RAO, albeit at rates somewhat less than originally anticipated. Based on LTRA groundwater monitoring and results from the optimization field investigation, the plume remains stable, is on the site property and is delineated to MCLs or RSLs. Except for PCP in MW-16A and MW-16B-R, concentrations of PCP and naphthalene are stable or decreasing. MW-16A and MW-16B-R have shown increasing trends for PCP since 2013. Monitoring well MW-16B-R and downgradient wells will continue to be monitored to track contaminant trends and monitor plume migration. The groundwater monitoring program is ongoing and sampling will be conducted by TCEQ as part of O&M work.

Institutional controls implemented at the site property restrict its development to non-residential uses, restrict groundwater use, prevent future installation of water supply wells, restrict excavation in the RCRA vault and require long-term maintenance of the RCRA vault. Although groundwater use is prohibited, a groundwater supply well remains on site. This supply well should be properly abandoned to remove any potential for future exposure and to prevent migration of contamination from the Sand-1 unit to the Sand-2 unit.

TCEQ conducts semi-annual maintenance and monitoring of the RCRA vault. The O&M Manual requires leachate removal if its measured height is greater than a foot. Measurements collected between November 2015 and July 2017 report leachate heights greater than one foot and at gradually increasing heights. Leachate removal has not been conducted since 2015. TCEQ should conduct leachate removal in the RCRA vault as required by the O&M Manual and to ensure the vault continues to function as intended.

TCEQ plans to include sampling of the newly-installed RCRA vault monitoring wells as part of future monitoring efforts. Sampling results will be used to assess the effectiveness of the RCRA vault over time.

Several monitoring wells were found unsecured during the FYR site inspection. While no evidence of tampering was observed, monitoring wells should be kept locked between sampling events. Installation of bollards around



monitoring wells MW-16A and MW-16B-R or implementing other protective measures during site redevelopment should also be considered to help maintain the integrity of the monitoring well network.

**QUESTION B:** Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

**Question B Summary:**

The exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of remedy selection are still valid.

The 2003 ROD identified PCP and naphthalene as groundwater COCs. The risk assessment conducted for the site concluded that there was no current exposure to contaminated groundwater above acceptable risk levels. However, because the concentration of PCP in groundwater was above the MCL, the remedial goal for PCP in groundwater is 1 µg/L based on the MCL established under the Federal Safe Drinking Water Act. The MCL for PCP has not changed since the 2003 ROD; the PCP cleanup goal remains valid.

EPA conducted confirmation sampling of surface soil across the Site following the TCRA in 2003. Results from the on-site confirmation samples were compared to TCEQ protective concentration levels (PCLs) valid at that time. All of the chemicals except 4-methylphenol were below TCEQ PCLs for commercial/industrial exposure. The detected concentration of 4-methylphenol (0.31 milligrams per kilogram, or mg/kg) is well below EPA's current (November 2017) RSL for commercial/industrial soil of 82,000 mg/kg. The detected concentration is also below the residential soil RSL of 6,300 mg/kg. The cleanup conducted during the TCRA remains protective of human health and the environment.

In February 2012, EPA released the final human health non-cancer dioxin reassessment, publishing an oral noncancer toxicity value, or reference dose (RfD), of  $7 \times 10^{-10}$  mg/kg-day for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in EPA's Integrated Risk Information System (IRIS).

Following completion of the TCRA, confirmation samples were collected on-site. However, the confirmation samples were not analyzed for TCDD. Although the confirmation samples were not analyzed for dioxins, the on-site soil remedy is considered protective in the short-term because there are no on-site workers, thus there is no current on-site exposure. To assess long-term protectiveness, additional soil sampling needs to be collected to compare residual soil exposure levels to the site-specific dioxin soil cleanup level based on the RfD.

Sediment samples were collected from Stewarts Creek in April 2003 because an on-site drainage channel discharged into Stewarts Creek. Upon analysis of analytical data, EPA conducted a removal action within Stewarts Creek in conjunction with the removal action taking place on-site. The removal action excavated approximately 2,500 stream feet of Stewarts Creek sediments. This excavation included approximately 1,000 stream feet of sediments from the on-site point of entry to Stewarts Creek to State Highway 105. In addition, approximately 1,500 stream feet of Stewarts Creek sediments were removed during the removal action south of State Highway 105. The 2003 removal activities in Stewart's Creek likely removed a substantial amount of dioxin contamination in soil/sediment that exceeded the preliminary remediation goal for residential soil of 0.05 micrograms per kilogram (µg/kg) expressed as toxicity equivalents for dioxin. Although confirmation samples were not collected in Stewarts Creek following the removal action, the off-site area is considered protective in the short-term because the most probable exposure pathway to creek sediment is a trespasser/visitor rather than a long-term resident. To assess long-term protectiveness, additional sediment sampling needs to be collected to compare residual sediment exposure levels to the site-specific dioxin cleanup level based on the RfD.

EPA's 2003 risk assessment evaluated a commercial/industrial exposure scenario at the Site. There have been no changes in direct exposure pathways since EPA selected and implemented the remedy. However, the vapor intrusion pathway was not evaluated in the 2003 risk assessment. Several chemicals detected in groundwater are sufficiently volatile. This FYR conducted a screening-level vapor intrusion evaluation using EPA's Vapor

Intrusion Screening Level (VISL) calculator to determine if vapor intrusion may be a concern for the Site under a commercial/industrial use scenario (Appendix I).

Maximum detected concentrations of volatile chemicals from shallow zone well MW-11A from the most recent sampling event in 2017 were used in the screening-level evaluation. The results found potentially unacceptable levels of risk associated with naphthalene in groundwater if buildings were to be constructed onsite in the future. The screening-level results of the assessment estimated a potential vapor intrusion carcinogenic risk for naphthalene of  $1.2 \times 10^{-4}$  and a noncancer hazard quotient (HQ) of 3.2, for a commercial use scenario. This cancer risk level exceeds EPA's risk management range ( $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ ) and the HQ exceeds EPA's noncancer threshold of 1. Currently, there are no buildings on site and no complete exposure pathways for vapor intrusion.

It should be noted that the calculated vapor intrusion cancer risks associated with naphthalene may be overstated because EPA has not classified naphthalene as a carcinogen. EPA's VISL calculator has incorporated an inhalation cancer-based toxicity value developed by the California Environmental Protection Agency as a conservative measure for screening this exposure pathway. The noncancer HQ based on an EPA-established toxicity value demonstrates that the vapor intrusion pathway may require further evaluation if buildings are constructed on site in the future.

Since the time of the ROD, site conditions and surrounding land use have not changed significantly. The new property owner has recently made infrastructure improvements at the Site and plans to redevelop the Site, except for the RCRA vault, into an industrial business park. There is also interest in extending a road across the Site to connect areas to the north and south. EPA will work with interested parties to ensure that roadway construction and use are consistent with land use restrictions at the Site.

RAOs for the Site remain valid. The 2003 ROD indicated that one of the RAOs was restoration of the groundwater within 10 to 20 years. The 2014 MNA evaluation found that attenuation of the plume was occurring, but not as rapidly as expected in the ROD.

**QUESTION C:** Has any other information come to light that could call into question the protectiveness of the remedy?

Hurricane Harvey made landfall in Texas in August 2017. In September 2017, EPA collected soil and groundwater samples at the Site to evaluate the potential effects from the hurricane. No SVOCs were detected in the groundwater samples. SVOCs were also not detected at levels of concern in soils. EPA concluded that the post-Hurricane Harvey condition of soil and groundwater at the Site is consistent with historical site conditions before the hurricane made landfall.

## VI. ISSUES/RECOMMENDATIONS

### Issues and Recommendations Identified in the FYR:

OU: Sitewide	<b>Issue Category: Remedy Performance</b>			
	<b>Issue:</b> The EPA released the final non-cancer dioxin reassessment publishing a non-cancer toxicity value, or reference dose (RfD), for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) in the Integrated Risk Information System (IRIS) in February of 2012. Following completion of the time critical removal action in 2003, confirmation samples were not analyzed for 2,3,7,8-TCDD. In addition, confirmation samples were not collected in excavated areas of Stewarts Creek. Therefore, there is no data available to compare residual soil exposure levels to the RfD.			
	<b>Recommendation:</b> Additional data collection is needed as part of the re-evaluation of the dioxin soil cleanup. It is currently unknown whether unacceptable exposure to dioxin would exist on-site for a future industrial land use scenario or in Stewarts Creek for an off-site residential visitor scenario. Data from this sampling will be used to determine if residual soil dioxin levels are protective of human health based upon the new 2,3,7,8-TCDD RfD.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party/Support Agency</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA/State	3/31/2021

### OTHER FINDINGS

Several additional recommendations were identified during the FYR. These recommendations do not affect current protectiveness.

- The facility's former supply well remains on site. This supply well should be properly abandoned to prevent future exposure to groundwater and to prevent potential contamination of the deeper aquifer from pumping, if the well were to be operated in the future.
- The vapor intrusion pathway was not evaluated in the 2003 risk assessment. Several chemicals detected in groundwater are sufficiently volatile. The vapor intrusion pathway is currently incomplete because there are no buildings on site. However, prior to construction of buildings, a site-specific vapor intrusion assessment should be conducted to determine if vapor intrusion is a concern for future site workers.
- Several monitoring wells were found unsecured during the FYR site inspection and a lock to an access gate was rusted. Wells should be locked between sampling events to prevent tampering. Rusted locks should be replaced as necessary.
- Monitoring wells MW-16A and MW-16B-R have flush-mounted surface completions, and evidence of earthwork was observed near these wells. Install protective bollards or implement protective measures to maintain the integrity of the well network during redevelopment.
- TCEQ plans to sample the RCRA vault monitoring wells in fiscal year 2018 to establish a baseline for evaluating the effectiveness of the RCRA vault. TCEQ should update the O&M Manual to address groundwater monitoring of the RCRA vault and to establish procedures for evaluating the effectiveness of the RCRA vault (e.g., statistical evaluation methods).
- Conduct leachate recovery as set forth by the Operations and Maintenance (O&M) Manual to ensure the RCRA vault continues to function as designed
- The Site's information repository should be updated with decision documents and FYR reports.

## VII. PROTECTIVENESS STATEMENT

### Sitewide Protectiveness Statement

*Protectiveness Determination:*  
Short-term Protective

*Protectiveness Statement:*

The Site's remedy is protective of human health and the environment in the short-term. The removal action removed contaminated materials, soils, sediments and wastes from the Site and placed them in an on-site RCRA vault. Data from ongoing groundwater monitoring indicate that groundwater contamination is limited to the Sand-1 unit and has not migrated off site. Institutional controls are in place to prohibit residential use of the Site, restrict the use of groundwater at the Site and protect the integrity of the RCRA vault. To assess long-term protectiveness, additional sampling needs to be collected to compare residual soil and sediment exposure levels to the site-specific dioxin soil and sediment cleanup levels based on the revised dioxin RfD.

## VIII. NEXT REVIEW

The next FYR Report for the Conroe Creosoting Company Superfund site is required five years from the completion date of this review.

## **APPENDIX A – REFERENCE LIST**

Final Letter Report of Leachate Measurement and O&M Inspection, Conroe Creosoting Company, Federal Superfund Site, 1776 East Davis Street, Conroe, Texas. AECOM. December 2015.

Final Letter Report of Leachate Sampling Activity and O&M Inspection, Conroe Creosoting Company, 1776 East Davis Street, Conroe, Texas. URS. March 2014.

Final Operations & Maintenance Manual, Conroe Creosoting Company Federal Superfund Site. URS Corporation. April 2013.

First Five-Year Review Report for the Conroe Creosoting Company Superfund Site, Conroe, Montgomery County, Texas. EPA Region 6. September 2008.

Optimization Investigation Report, Revision 00, Conroe Creosoting Company Site. EA Engineering, Science, and Technology, Inc., PBC. June 2017.

Optimization Review Report, Long-Term Response Action Stage, Conroe Creosoting Company NPL Site, Montgomery County, Texas. EPA Region 6. April 2015.

Record of Decision, Conroe Creosoting Company, Conroe, Montgomery County, Texas. EPA Region 6. September 2003.

Sampling and Analysis Plan (Revision 01), Conroe Creosoting Company Site Long-Term Response Action. EA Engineering, Science, and Technology, Inc. April 2010.

Second Five-Year Review Report, Conroe Creosoting Superfund Site, Conroe, Montgomery County, Texas. EPA Region 6. September 2013.

Technical Memorandum, Ground Water Sampling Activities (January 2013), Long-Term Response Action, Conroe Creosoting Company, Conroe, Montgomery County, Texas, EA Engineering, Science, and Technology, Inc. March 2013.

Technical Memorandum, Ground Water Sampling Activities (July 2014), Long-Term Response Action, Conroe Creosoting Company, Conroe, Montgomery County, Texas, EA Engineering, Science, and Technology, Inc. September 2014.

Technical Memorandum on Performance Assessment of Natural Attenuation Remedy, Conroe Creosoting Site, Conroe, Montgomery County, Texas. EA Engineering, Science, and Technology, Inc. November 2014.

## APPENDIX B – SITE CHRONOLOGY

**Table B-1: Site Chronology**

Event	Date
TCEQ conducted Compliance Evaluation Investigations at the wood-treating facility	1988, 1991, 1993
TCEQ issued an Agreed Order to Conroe Creosoting	1994
TCEQ and others conducted an environmental site assessment to evaluate contamination in surface and subsurface soil and shallow groundwater	September 1996
Wood-treating operations ceased at the facility	1997
TCEQ issued a second Agreed Order to Conroe Creosoting	1999
EPA conducted a removal assessment at the facility	January 2002
EPA conducted an off-site assessment to determine the nature and extent of site-related contamination in off-site drainage pathways, including Stewart's Creek and Little Caney Creek	July 2002
EPA began a removal action and constructed the RCRA vault to contain and consolidate waste and contaminated soil and sediment	September 2002
TCEQ performed an ESI	December 2002
EPA completed the Phase I remedial investigation	April 2003
EPA completed the Phase II remedial investigation	May 2003
EPA listed the Site on the NPL	September 22, 2003
EPA issued a sitewide ROD	September 29, 2003
EPA signed the Preliminary Close-out Report	
EPA conducted an ISCO pilot test	September 2006
EPA performed a second ISCO pilot test	June 2008
EPA signed the first FYR Report	September 2008
EPA and Conroe Creosoting recorded an Environmental Protection Easement and Declaration of Restrictive Covenants with the Montgomery County Clerk's office; East Davis Development purchased the site property from Conroe Creosoting	March 2011
EPA and East Davis Development executed a Consent for Entry and Access to Property to allow EPA continued access to the Site for sampling and upkeep of the groundwater monitoring network	September 2011
TCEQ's contractor conducted repairs to the RCRA vault's cap and side slopes	July through October 2012
TCEQ finalized an O&M Manual for the RCRA vault	April 2013
EPA issued the second FYR Report	September 2013
EPA prepared the Performance Assessment of Natural Attenuation Remedy	November 2014
EPA completed the Optimization Review Report	April 2015
EPA prepared the Optimization Investigation Report	June 2017

## APPENDIX C – INSTITUTIONAL CONTROLS



LT1-1-2011825807-1

Old Republic Title  
GF # 1002305A

12  
C

APPENDIX E

Page 1

### ENVIRONMENTAL PROTECTION EASEMENT AND DECLARATION OF RESTRICTIVE COVENANTS

1. This Environmental Protection Easement and Declaration of Restrictive Covenants is made this \_\_\_\_ day of \_\_\_\_\_, 2010, by and between Conroe Creosoting Company c/o Charlene Muller, President, ("Grantor") having an address of ~~1445~~ 801 West Dallas, TX 77301 and Environmental Protection Agency ("Grantee") having an address of 1445 Ross Avenue, Dallas, TX 75202.

WITNESSETH:

2. WHEREAS, Grantor is the owner of a parcel of land located in the county of Montgomery, State of Texas, more particularly described on Exhibit A attached hereto and made a part hereof together with any buildings and improvements thereon and appurtenances thereto (the "Property"); and
3. WHEREAS, the Property is part of the Conroe Creosoting Superfund Site ("Site"), which the U.S. Environmental Protection Agency ("EPA"), pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act CERCLA", 42 U.S.C. § 9605, placed on the National Priorities List, as set forth in Appendix 13 of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300, by publication in the Federal Register on September 22, 2003; and
4. WHEREAS, the Site, which is identified as the Conroe Creosoting Superfund Site, TCEQ Remediation Division, Superfund Section (Identification Number SUP091). More information is available from the TCEQ Central Records Office or the TCEQ website. The addresses for TCEQ are as follows:

Physical:

Texas Commission on Environmental Quality  
Central Records Office



LT2-13



12100 Park 35 Circle, Building E  
Austin, TX 78753

**Mailing:**

Texas Commission on Environmental Quality  
Central Records Office, MC-213  
P.O. Box 13087  
Austin, TX 78711-3087

5. WHEREAS, in a Record of Decision dated September 29, 2003, (the "ROD"), the EPA Region 6 Superfund Division Director selected, and the Texas Commission on Environmental Quality ("TCEQ") concurred with, a "remedial action" for the Site, which provides, in part, for the following actions:
- a. A ground water monitoring program to track the effectiveness of natural attenuation processes in reducing contaminant concentrations in the Sand-1 aquifer as well as ensure that there is no exposure to contaminants above the drinking water limits;
  - b. Long-term maintenance of the RCRA vault containing the contaminated soils and sediments excavated from the Site and adjacent Stewart's Creek; and
  - c. Placement of appropriate institutional controls to ensure that any future land owners will be notified that the land was a former Superfund site and hazardous substances remaining on-site in the ground water are above health-based concentration levels; prevent future installations of water supply wells at the Site; and restrict future redevelopment of the property to non-residential use based on contaminant concentrations remaining in the surface soils. EPA will attempt to negotiate an Administrative Order on Consent or other mechanism implementing a property easement and/or other appropriate controls with the landowner of the Site.
6. WHEREAS, with the exception of implementation of the institutional controls, the remedial action has been implemented at the Site; and

7. WHEREAS, the parties hereto have agreed 1) to grant a permanent right of access over the Property to the Grantee for purposes of implementing, facilitating and monitoring the remedial action; and 2) to impose on the Property use restrictions as covenants that will run with the land for the purpose of protecting human health and the environment;
8. WHEREAS, Grantor wishes to cooperate fully with the Grantee in the implementation of all response action at the Site;

NOW THEREFORE

9. Grant: Grantor, on behalf of itself, its successors and assigns, in consideration of [the terms of the Consent Decree in the case of United States and State of Texas v. Conroe Creosoting Company], does hereby covenant and declare that the Property shall be subject to the restrictions on use set forth below, and does give, grant and convey to the Grantee, and its assigns, with general warranties of title, 1) the perpetual right to enforce said use restrictions, and 2) an environmental protection easement of the nature and character, and for the purposes hereinafter set forth, with respect to the Property.
10. Purpose: It is the purpose of this instrument to convey to the Grantee real property rights, which will run with the land, to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to contaminants.
11. Restrictions on use: The following restrictions on use apply to the use of the Property, run with the land and are binding on the Grantor:
  - a. Prohibit the installation of water wells at the Conroe Creosoting Site. The restrictions would prevent use of the Sand-1 aquifer until the remedial goals have been attained across the Site and the installation of wells within the former process and disposal areas to prevent the downward movement of creosote and pentachlorophenol during the well installation process;

- b. Prohibit the removal of vegetation from the landfill cover, if such removal may result in the subsequent erosion or removal of the soil cover over the landfill or treated material
- c. Prohibit the excavation or trenching into the RCRA landfill contents (the RCRA landfill contents exceed TCEQ protective cleanup levels (PCLs) , or the associated soil cover;
- d. Restrict future redevelopment of the property to non-residential use based on contaminant concentrations remaining in the surface soils; and
- e. Notification to any future land owners that the land was a former Superfund site and hazardous substances remaining on-site in the ground water are above health-based concentration levels

12. Modification of restrictions: The above restrictions may be modified, or terminated in whole or in part, in writing, by the Grantee. If requested by the Grantor, such writing will be executed by Grantee in recordable form:

13. Right of access: A right of access for the United States, the State of Texas, and their employees, representatives, agents, contractors, and subcontractors, to the Property at all reasonable times for the following purposes shall run with the land and be binding on Grantor:

- a. Implementing the response actions in the ROD;
- b. Verifying any data or information relating to the Site;
- c. Verifying that no action is being taken on the Property in violation of the terms of this instrument or of any federal or state environmental laws or regulations;
- d. Monitoring response actions on the Site and conducting investigations relating to contamination on or near the Site, including, without limitation, sampling of air, water, sediments, soils, and specifically, without limitation, obtaining split or duplicate samples;
- e. Making appropriate repairs to the RCRA vault containing the contaminated soils and sediments excavated from the Site and adjacent Stewart's Creek;

- f. Conducting periodic reviews of the remedial action, including but not limited to, reviews required by applicable statutes and/or regulations;
- g. Implementing additional or new response actions if the Grantee, in its sole discretion, determines i) that such actions are necessary to protect the environment because either the original remedial action has proven to be ineffective or because new technology has been developed which will accomplish the purposes of the remedial action in a significantly more efficient or cost effective manner; and, ii) that the additional or new response actions will not impose any significantly greater burden on the Property or unduly interfere with the then existing uses of the Property

In conducting such activities on the Property, the party having access to the Property shall use reasonable efforts to minimize interference with or interruption of Grantor's use of the Property, to the extent consistent with the requirements of the Consent Decree, and shall provide to the Grantor the results from any sampling on the Property.

- 14. Reserved rights of Grantor: Grantor hereby reserves unto itself, its successors, and assigns, all rights and privileges in and to the use of the Property which are not incompatible with the restrictions, rights, covenants and easements granted herein.
- 15. Federal authority: Nothing in this document shall limit or otherwise affect EPA's rights of entry and access or EPA's authority to take response actions under CERCLA, the NCP, or other federal law.
- 16. No public access and use: No right of access or use by the general public to any portion of the Property is conveyed by this instrument.
- 17. Notice requirement: Grantor agrees to include in any instrument conveying any interest in any portion of the Property, including but not limited to deeds, leases and mortgages, a notice which is in substantially the following form:

**NOTICE: THE INTEREST CONVEYED HEREBY IS  
SUBJECT TO AN ENVIRONMENTAL PROTECTION  
EASEMENT AND DECLARATION OF RESTRICTIVE**

**COVENANTS, DATED August \_\_, 2009, RECORDED IN  
THE OFFICE OF THE COUNTY CLERK, MONTGOMERY  
COUNTY, TEXAS, ON \_\_, 2010, IN BOOK \_\_, PAGE  
\_\_, IN FAVOR OF, AND ENFORCEABLE BY, THE TEXAS  
COMMISSION ON ENVIRONMENTAL QUALITY AND BY  
THE UNITED STATES OF AMERICA.**

Within thirty (30) days of the date any such instrument of conveyance is executed, Grantor must provide Grantee with a certified true copy of said instrument and, if it has been recorded in the public land records, its recording reference.

18. Administrative jurisdiction: The federal agency having administrative jurisdiction over the interests acquired by the United States by this instrument is the EPA.
19. Enforcement: The Grantee shall be entitled to enforce the terms of this instrument by resort to specific performance or legal process. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Enforcement of the terms of this instrument shall be at the discretion of the Grantee, and any forbearance, delay or omission to exercise its rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Grantee of such term or of any subsequent breach of the same or any other term, or of any of the rights of the Grantee under this instrument.
20. Damage: Grantee shall be entitled to recover damages for violations of the terms of this instrument, or for any injury to the remedial action, to the public or to the environment protected by this instrument.
21. Waiver of certain defenses: Grantor hereby waives any defense of laches, estoppel, or prescription.
22. Covenants: Grantor hereby covenants to and with the United States and its assigns, that the Grantor is lawfully seized in fee simple of the Property, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein, that the Property is free and clear of encumbrances, and that the Grantor will forever warrant and defend the title thereto and the quiet possession thereof.
23. Notices: Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor:

Conroe Creosoting Company  
c/o Charline Muller, President  
804 ~~1102~~ West Dallas #1  
Conroe, TX 77301

To Grantee:

Environmental Protection Agency  
1445 Ross Avenue  
Dallas, TX 75202

A copy of each such communication shall also be sent to the following: To EPA:

Gary A. Baumgarten  
1445 Ross Avenue (6SP-RA)  
Dallas, TX 75202

**24. General provisions:**

- a. **Controlling law:** The interpretation and performance of this instrument shall be governed by the laws of the United States or, if there are no applicable federal laws, by the law of the state where the Property is located.
- b. **Liberal construction:** Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the grant to effect the purpose of this instrument and the policy and purpose of CERCLA. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.
- c. **Severability:** If any provision of this instrument, or the application of it to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or the application of such provisions to persons or circumstances other than those to which it is found to be invalid, as the case may be, shall not be affected thereby.
- d. **Entire Agreement:** This instrument sets forth the entire agreement of the parties with respect to rights and restrictions created hereby, and supersedes all prior discussions, negotiations, understandings, or agreements relating thereto, all of which are merged herein.
- e. **No Forfeiture:** Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.
- f. **Joint Obligation:** If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.
- g. **Successors:** The covenants, terms, conditions, and restrictions of this instrument shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the Property. The term "Grantor", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns. The term "Grantee", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantee" and their personal representatives, heirs, successors, and assigns. The rights of the Grantee and Grantor under this instrument are freely assignable, subject

to the notice provisions hereof.

- h. **Termination of Rights and Obligations:** A party's rights and obligations under this instrument terminate upon transfer of the party's interest in the Easement or Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.
- i. **Captions:** The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.
- j. **Counterparts:** The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

TO HAVE AND TO HOLD unto the United States and its assigns forever.

IN WITNESS WHEREOF, Grantor has caused this Agreement to be signed in its name.

Executed this 30 day of July, 2010.

By: Charlie Muller

Its: President

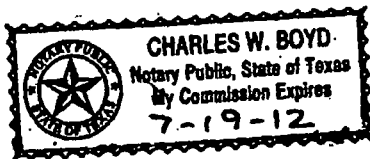
STATE OF TEXAS)

) COUNTY OF

MONTGOMERY)

On this 30 day of July, 2010, before me, the undersigned, a Notary Public in and for the State of Texas, duly commissioned and sworn, personally appeared ABOVE known to be the President of Conroe Creosoting, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute said instrument.

Witness my hand and official seal hereto affixed the day and year written above.



*Charles W. Boyd*

Notary Public in and for the  
State of Texas

My Commission Expires:

This easement is accepted this 28<sup>th</sup> day of Sept, 2010.

UNITED STATES OF AMERICA

the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns.

U.S. ENVIRONMENTAL PROTECTION  
AGENCY

By:

*Barbara Samuel Coleman*

Attachment: Exhibit A - legal description of the Property

Return TO: Robin Morse, Atty.  
1401 McKinney, Suite 1700  
Houston, TX. 77010



## Exhibit A - Legal Description of the Property

BEING 149.227 acres of land in the Lemuel Smith Survey, A-526, Montgomery County, Texas and being out of the Henry Runge Addition, map of which is recorded in Volume 1, Page 8 of Montgomery County Map Records (MCMR) also being out of several tracts of land described in deeds to Conroe Cressoting Company called 61.36 acres recorded in Volume 261, Page 264 of Montgomery County Deed Records (MCDR), 9.00 acres and 20.39 acres recorded in Volume 265, Page 612 MCDR, 2.38 acres recorded in Volume 318, Page 53 MCDR, 44.91 acres recorded in Volume 871, Page 724 MCDR, and 5.962 acres recorded in Volume 898, Page 815 MCDR, a portion of said property mentioned in L. S. Pendens recorded under film code #804-00-1054 Real Property Records of Montgomery County, Texas, said 149.227 acres being more particularly described as follows:

BEGINNING at a concrete monument found marking the southeast corner of above mentioned 20.39 acre tract and the southwest corner of a Gulf States utility Company fee tract described in deed recorded in Volume 480, Page 532 MCDR, in the north right-of-way line of State Highway 105, right-of-way varies and is recorded in Volume 182, Page 108 MCDR, for the southeast corner of herein described tract;

THENCE S. 82°41'11"W., (Hwy. Call N. 85°53'E.) along the south line of said 20.39 acres and the north line of State Highway 105 for a distance of 951.27 feet to a 1/2" capped iron rod set for the beginning of a 03°00' curve to the left;

THENCE continuing along the south line of said 20.39 acres and the south line of said 61.36 acres, also the north line of State Highway 105 on a curve to the left having a radius of 1909.86 feet (Call 03°00' curve) and a central angle of 20°15'43" for a distance of 675.39 feet, chord bears S. 72°33'20"W., 671.88', to a 1/2" capped iron rod set for the end of said curve;

THENCE S. 62°25'29"W., (Hwy. Call N. 65°47'E.) continuing along the south line of said 61.36 acres and the north line of State Highway 105 for a distance of 1343.21 feet to a 1/2" iron rod found for the southwest corner of herein described tract and the southeast corner of Fred McCrory 7.20 acre tract described in deed recorded in volume 898, Page 818 MCDR;

THENCE N. 20°29'45"W., (J.P. Waddill 1948 Survey Call N. 16°00' W., 475.7') along the lower west line of said Conroe Cressote Company tract and the east line of said 7.20 acres for a distance of 630.30 feet to a 1/2" iron rod found for its northeast corner and the southeast corner of said 5.962 acres, and an inside corner of herein described tract;

THENCE S. 68°14'28"W., (Call S. 71°50'34"W., 246.41') along the south line of said 5.962 acres and the north line of said 7.20 acres for a distance of 246.30 feet to a 1/2" iron rod found for an angle point in same;

THENCE S. 57°39'11"W., (Call S. 61°17'29"W., 606.40') continuing along the south line of said 5.962 acres and the north line of said 7.20 acres 545.9' past a 1/2" iron rod found for a reference corner and continue on in all a total distance of 605.91 feet to the center-line of Stewart's Creek, for the upper southwest corner of herein described tract;

THENCE up the center-line of Stewart's Creek along its meanders as follows:

S. 86°01'05"W., (Call S. 89°43'14"W., 57.60') for a distance of 57.60 feet;

N. 10°42'55"W., (Call N. 07°00'46"W., 325.60') for a distance of 325.60 feet;

N. 39°09'55"W., (Call N. 31°27'46"W., 54.59') for a distance of 54.91 feet to the northwest corner

of said 5.962 acres in the south line of David Abner, Estate 14.35 acre tract described in deed recorded in volume 83, Page 624 MCDR, for the lower northwest corner of herein described tract;

THENCE N. 70°21'50"E., (Call N. 74°12'34"E., 434.92') along the north line of said 5.962 acres and the south line of said 14.35 acres, at 105.57 feet pass a 1/2" iron pipe found for a reference corner and continue on in all for a total distance of 435.35 feet to a 1/2" iron rod found for the southeast corner of said 14.35 acres and the

southeast corner of said 44.91 acres, for an inside corner of herein described tract

THENCE N. 18°59'51"W., (Call N. 15°32'27"E., 1169.97') along the west line of said 14.35 acres and the west line of said 44.91 acres for a distance of 1169.43 feet to a concrete monument found for their northwest and northeast corners respectively, also the southwest corner of a Gulf States Utility Company 3.92 acre tract described in deed recorded in Volume 304, Page 338 MCDR, for the northwest corner of herein described tract;

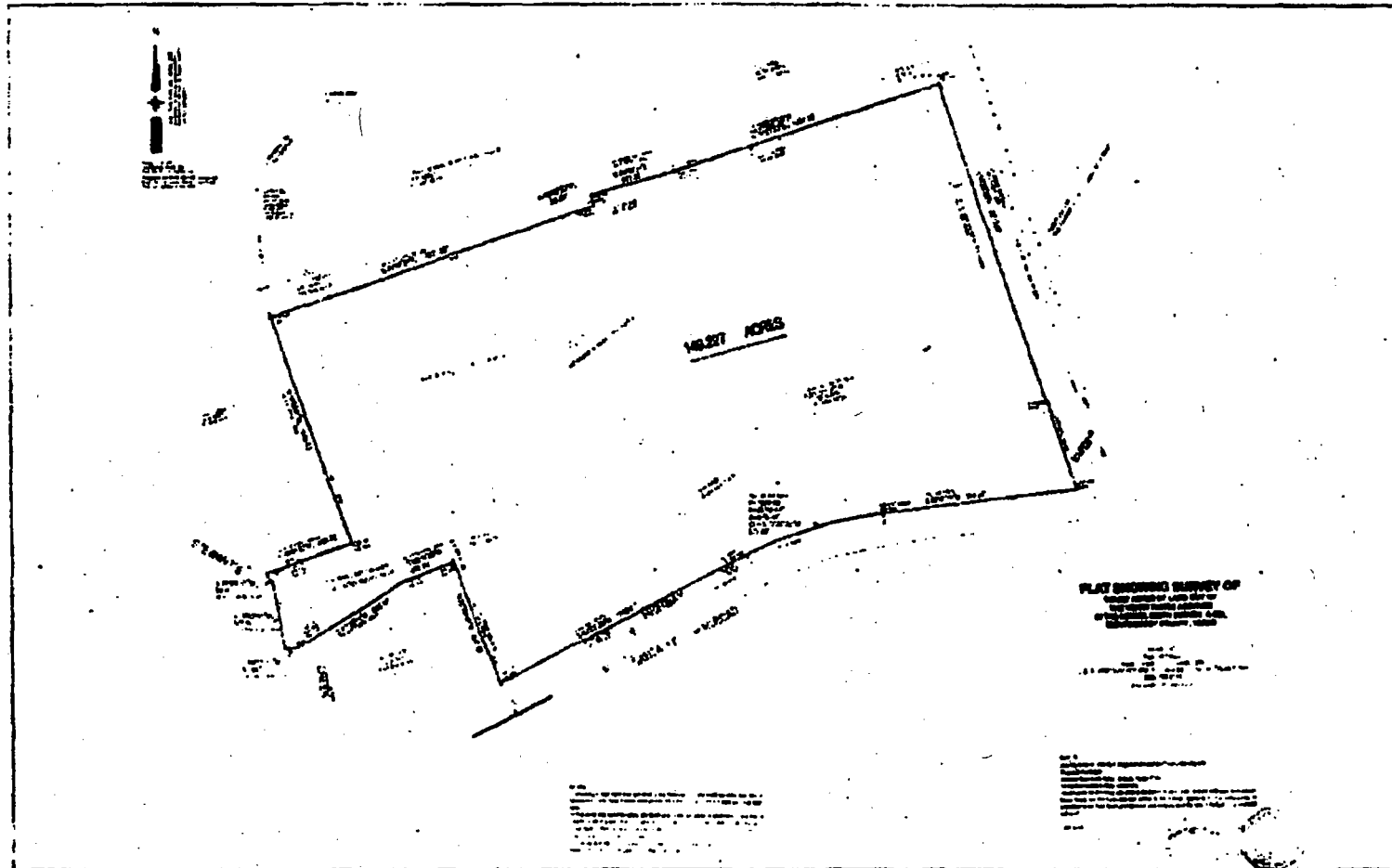
THENCE N. 70°47'21"E., (Call N. 74°15'10"E., 1631.89') along the north line of said 44.91 acres and the south line of said 3.92 acres for a distance of 1631.28 feet to a concrete monument found for their northeast and southeast corner respectively, in the west line of said 61.36 acres, for an inside corner of herein described tract;

THENCE N. 18°40'22"W., (Call N. 15°W., 1320') along the west line of said 61.36 acres and the east line of said 3.92 acres for a distance of 55.24 feet to an iron stake found for their northwest and northeast corners respectively in the south line of Comroe Normal and Industrial College 78.8 acre tract described in deed recorded in Volume 62, Page 406 MCDR, for an upper northwest corner of herein described tract;

THENCE N. 74°49'31"E., (Call by Waddill 1948 Survey N. 78°18"E., 422.2') along the north line of said 61.36 acres and the south line of said 78.8 acres for a distance of 423.36 feet to a cone monument found for the southeast corner of said 78.8 acres and the southwest corner of O. L. King 43.16 acres described in deed recorded in Volume 346, Page 72 MCDR, for an angle point in the north line of herein described tract;

THENCE N. 71°33'33"E., (Call by Waddill 1948 Survey N. 75°00"E., 1337.0') along the north line of said 61.36 acres and said 9.0 acres, also the south line of said 43.16 acres, passing its southeast corner and the southwest corner of W. B. Etheridge 1.0 acre tract described in deed recorded in Volume 625, Page 235 MCDR, and continue on in all a total distance of 1337.38 feet to a 1" iron pipe found for the northeast corner of said 9.0 acres and the southeast corner of said 1.0 acre in the west line of Timberloch East Subdivision, map of which is recorded in Cabinet D, Sheet 191-B MCDR, for the northeast corner of herein described tract;

THENCE S. 18°28'00"E., (Call by Waddill 1948 Survey S. 15°00"E., 2075.3') along the east line of said 9.0 acres, 61.36 acres and 20.39 acres, also the west line of said Timberloch East Subdivision and said Gulf States Utility Company fee tract for a distance of 2073.02 feet to the POINT OF BEGINNING and containing 149.227 acres of land.



**FILED FOR RECORD**

03/25/2011 3:50PM

*Mark Tumball*  
COUNTY CLERK  
MONTGOMERY COUNTY, TEXAS

**STATE OF TEXAS  
COUNTY OF MONTGOMERY**

I hereby certify this instrument was filed in file number sequence on the date and at the time stamped herein by me and was duly RECORDED in the Official Public Records of Montgomery County, Texas.

03/25/2011



*Mark Tumball*  
County Clerk  
Montgomery County, Texas

**RECORDER'S MEMORANDUM:**  
At the time of recordation, this instrument was found to be inadequate for the best photographic reproduction because of illegibility, carbon or photo copy, discolored paper, etc. All black-outs, additions and changes were present at the time the instrument was filed and recorded.

## APPENDIX D – PUBLIC NOTICE



### **Conroe Creosoting Company Superfund Site Public Notice U. S. Environmental Protection Agency, Region 6 Third Five-Year Review of Site Remedy**

**October 2017**

The U.S. Environmental Protection Agency Region 6 (EPA) will be conducting the third five-year review of remedy implementation and performance at the Conroe Creosoting Company Superfund site (Site) in Conroe, Texas. A wood-treating facility operated at the Site from 1946 to 1997. The site-wide remedy includes monitored natural attenuation of groundwater, long-term maintenance of an on-site Resource Conservation and Recovery Act landfill, and implementation of institutional controls to restrict land use and control exposures. The five-year review will determine if the remedy is still protective of human health and the environment. The five-year review is scheduled for completion by September 2018.

The report will be made available to the public at the following local information repository:

Montgomery County Memorial Library  
Central Branch (Conroe)  
104 Interstate 45 North  
Conroe, Texas 77301  
(936) 539-7814

Site status updates are available on the Internet at  
[www.epa.gov/superfund/conroe-creosoting](http://www.epa.gov/superfund/conroe-creosoting)

All media inquiries should be directed to the EPA Press Office at (214) 665-2200

For more information about the Site, contact:

Gary Baumgarten/Remedial Project Manager  
(214) 665-6749  
or 1-800-533-3508 (toll-free)  
or by email at [baumgarten.gary@epa.gov](mailto:baumgarten.gary@epa.gov)

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## APPENDIX E – INTERVIEW SUMMARY FORMS

### Conroe Creosoting Company Superfund Site

### Five-Year Review Interview Form

Site Name: Conroe Creosoting Company

EPA ID No.: TXD008091951

Subject Name: McCalley, Dee

Affiliation: TCEQ

Time: 11:00 a.m.

Date: 1/19/2018

Interview Format (circle one): In Person

Phone

Mail

Other: email

Interview Category: State Agency

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

The third FYR site visit was conducted on October 19, 2017.

The RCRA landfill is in good shape with vegetation covering most of the top of the landfill. There are a few bald spots, however, the majority of the cap is well established with vegetation. No trees were noted although there are some growing in the fence surrounding the cap.

2. What is your assessment of the current performance of the remedy in place at the Site?

The remedy appears to be functioning as designed. However, data is pending on the recently installed 'sentry wells' to verify that groundwater has not been impacted from the landfill.

Data from the existing well network, including the new wells installed during the optimization period, indicate that the plume in the Sand 1 unit is delineated to the south and there are no indications of contamination off site. As noted in the previous FYR, many of the excavation areas around the former process areas do not have monitoring wells, particularly in the deeper groundwater units (Sand 2). Any off-site migration of NAPL in either the Sand 1 or Sand 2 unit would be a concern.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

None that has been brought to my attention.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

Yes. TCEQ provides semi-annual maintenance and site security observations of the landfill cap and also monitors the leachate levels in the landfill. The leachate was removed, filtered and treated in December 2014-January 2015, and the treated water was 'sprinkled' back onto the landfill. Further leachate recovery has not been necessary.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

No.

- 6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?**

Yes.

- 7. Are you aware of any changes in projected land use(s) at the Site?**

No.

- 8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?**

Annual sampling/monitoring should continue on the Site for all of the monitoring wells. Four new 'sentry' wells were installed around the RCRA landfill (one upgradient and three downgradient). These wells have not been sampled. An initial sampling event of the sentry wells will be scheduled this fiscal year to establish a baseline. Once the sampling event report is received, TCEQ intends to use the data to monitor the integrity of the landfill.

**Conroe Creosoting Company  
Superfund Site**

**Five-Year Review Interview Form**

**Site Name:** Conroe Creosoting Company

**EPA ID No.:** TXD008091951

**Interviewer Name:** Matt Marquis

**Affiliation:** Symmetry Development

**Subject Name:** Owners Agent

**Affiliation:** East Davis Development

**Time:** 11:00 a.m.

**Date:** 1/19/2018

**Interview Format (circle one):** In Person

**Phone**

**Mail**

**Other: email**

1. What is your overall impression of the remedial activities at the Site?

To my knowledge, agencies are overseeing;

- a. The monitoring of groundwater from monitoring wells.
- b. The monitoring and/or maintenance of the RCRA cap/vault.

2. What have been the effects of the Site on the surrounding community, if any?

None are known at this time.

3. What is your assessment of the current performance of the remedy in place at the Site?

It appears the goals are being achieved per the agencies' comments and observations.

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

None are known at this time.

5. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

Yes.

6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

The City of Conroe has plans to extend a major thoroughfare from the intersection of FM 1314 and State Highway 105 to Airport Road. This new road will bisect the site on the west end of the site. The right of way is intended to be dedicated as public use with public utilities.



## APPENDIX F – DATA REVIEW SUPPORTING DOCUMENTATION

**Table F-1: PCP and Naphthalene Concentrations in Groundwater**

(Source: 2017 Optimization Investigation Report)

**Cumulative Naphthalene and Pentachlorophenol Concentrations in Ground Water**

Monitoring Well ID	Compound	MCL/RSI	November 2005 (µg/L)	February 2006 (µg/L)	October 2006 (µg/L)	August 2008 (µg/L)	September 2008 (µg/L)	May 2010 (µg/L)	August 2010 (µg/L)	October 2010 (µg/L)	May 2011 (µg/L)	October 2011 (µg/L)	March 2012 (µg/L)	October 2012 (µg/L)	January 2013 (µg/L)	December 2013 (µg/L)	July 2014 (µg/L)	February 2017 (µg/L)
<b>SAND-1 Shallow Monitoring Wells</b>																		
MW-1A	Napthalene	0.17	NS	NS	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	NS	<1.0	NS	NS	<0.20	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-2A	Napthalene	0.17	NS	NS	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	NS	<1.0	NS	NS	<0.20	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-3A	Napthalene	0.17	NS	<0.5	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	<0.9	<1.0	NS	NS	0.95 J	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-4A	Napthalene	0.17	NS	NS	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	NS	<1.0	NS	NS	0.040 LJ	<0.20/ *0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-5A	Napthalene	0.17	<0.5	<0.5	<0.5	NS	NS	0.027	<5.0	<5.0	<0.5	0.10 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.097 U
	Pentachlorophenol	1.0	<1.0	<0.9	<1.0	NS	NS	<0.20 UJv	<0.20	<0.40 J	<0.9	0.20 UJv	0.20 U	0.9 U	1.0 U	0.9 U	1.0 U	0.194 U
MW-6A	Napthalene	0.17	<0.5	<0.5	<0.5	NS	NS	<5.0	<5.0	<5.0	<0.5	0.10 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.0967 U
	Pentachlorophenol	1.0	<1.0	<0.9	<1.0	NS	NS	<0.20 UJv	<0.20	<0.40 J	<1.0	0.20 UJv	0.20 U	0.9 U	1.0 U	1.0 U/ *0.9 U	0.9 U	0.193 U
MW-7A	Napthalene	0.17	NS	<0.5	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	<1.0	<1.0	NS	NS	<0.20 UJv	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
<sup>1</sup> MW-8A/MW-15A	Napthalene	0.17	164	11.5	36.5	NA	NA	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	109	13.3	78.7	82,700	106,000	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-9A	Napthalene	0.17	NS	<0.5	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	<1.0	<1.0	NS	NS	<0.20 UJv	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
<sup>2</sup> MW-10A/MW-16A	Napthalene	0.17	1.2	NS	1.3	NA	NA	2.1 J	<5.0	8.0	0.6	0.10 UJ	5.0 U	0.5 U	0.5 U	2.8	0.7	0.0956 U
	Pentachlorophenol	1.0	61.1	NS	1.3	1.8	2.2	100 J/ *72 J	0.25/ *0.20	8.7	28.9	5.6 J	0.37 J	8.7	1.8	4.2	6.8	14.8
MW-11A	Napthalene	0.17	<0.5	<0.5	<0.5	NS	NS	4,600	3,300	3,600	4,670	6,000	4,800	2,410	3,740	3,970	2,020	2,790/ *2,720
	Pentachlorophenol	1.0	1.4	<0.9	1.6	NS	NS	110/ *97 J	0.86 LJ/ *1.8	78 J	48.4/ *44.3	84 J/ *72 J	36/ *1.1 LJ	42.4/ *36.7	39.2/ *43.0	66.1	68.1	12.4/ *10.4
MW-17A	Napthalene	0.17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0963 U
	Pentachlorophenol	1.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.193 U
MW-18A	Napthalene	0.17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0962 U
	Pentachlorophenol	1.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.192 U
<b>SAND-1 Deep Monitoring Wells</b>																		
MW-1B	Napthalene	0.17	NS	NS	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	NS	<1.0	NS	NS	<0.20	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-2B	Napthalene	0.17	NS	NS	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	NS	<1.0	NS	NS	<0.20	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-3B	Napthalene	0.17	NS	<0.5	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	<0.9	<1.0	NS	NS	<0.20	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-4B	Napthalene	0.17	NS	NS	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	NS	<1.0	NS	NS	0.082 LJ	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A



**Cumulative Naphthalene and Pentachlorophenol Concentrations in Ground Water**

Monitoring Well ID	Compound	MCL/RSL	November 2005 ((µg/L)	February 2006 ((µg/L)	October 2006 ((µg/L)	August 2008 ((µg/L)	September 2008 ((µg/L)	May 2010 ((µg/L)	August 2010 ((µg/L)	October 2010 ((µg/L)	May 2011 ((µg/L)	October 2011 ((µg/L)	March 2012 ((µg/L)	October 2012 ((µg/L)	January 2013 ((µg/L)	December 2013 ((µg/L)	July 2014 ((µg/L)	February 2017 ((µg/L)
<b>SAND-1 Deep Monitoring Wells</b>																		
MW-5B	Napthalene	0.17	<0.5	<0.5	<0.5	NS	NS	<5.0	<5.0	<5.0	<0.5	0.10 U	<b>2.1 LJ</b>	0.5 U	0.5 U	0.5 U	0.5 U	0.0968 U
	Pentachlorophenol	1.0	<1.0	<0.9	<1.0	NS	NS	0.18 LJ	<0.20	0.29 LJ/ *0.93	<0.9	0.20 UJv/ *0.20 UJv	0.20 U	1.0 U	0.9 U	0.9 U	0.9 U	0.194 U
MW-6B	Napthalene	0.17	<0.5	<0.5	<0.5	NS	NS	<5.0	<5.0	<5.0	<0.5	0.10 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.0963 U
	Pentachlorophenol	1.0	<1.0	<1.0	<1.0	NS	NS	0.22 J	<0.20	0.26 LJ	<0.9	0.20 UJv	0.20 U	0.9 U	0.9 U	1.0 U	0.9 U	0.193 U
MW-7B	Napthalene	0.17	NS	<0.5	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	<0.9	<1.0	NS	NS	0.042 LJ	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
MW-8B	Napthalene	0.17	<0.5	<0.5	<0.5	NA	NA	<5.0	<5.0	<5.0	<0.5	0.10 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.097 U
	Pentachlorophenol	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.044 LJ	<0.20	<0.40 J	<0.9	0.20 UJv	0.20 U	0.9 U	0.9 U	1.0 U/ *1.0 U	0.9 U	0.194 U
MW-9B	Napthalene	0.17	NS	<0.5	<0.5	NS	NS	<5.0	<5.0	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
	Pentachlorophenol	1.0	NS	<0.9	<1.0	NS	NS	0.24	<0.20	NS	P&A	P&A	P&A	P&A	P&A	P&A	P&A	P&A
<sup>2,3</sup> MW-10B/MW-16B/MW-16B-R	Napthalene	0.17	<0.5	NS	<0.5	NA	NA	NS	NS	<b>1.9 LJ</b>	<0.5	0.10 U	5.0 U	0.5 U	0.5 U	<b>1.3</b>	<b>0.7</b>	0.0962 U
	Pentachlorophenol	1.0	<b>713</b>	NS	<b>7.0</b>	<b>0.4</b>	<b>0.3</b>	NS	NS	<b>1.3 / *0.3</b>	<b>4.9 / *5.0</b>	<b>0.23</b>	0.20 U	<b>3.7</b>	<b>4.0</b>	<b>4.5</b>	<b>3.3</b>	<b>0.093</b>
MW-17B	Napthalene	0.17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0945 U
	Pentachlorophenol	1.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.189 U
<b>SAND-2 Monitoring Wells</b>																		
MW-12	Napthalene	0.17	NS	NS	<0.5	NS	NS	<5.0	<5.0	<5.0	<0.5	0.10 U	<b>2.4 LJ</b>	0.5 U	0.5 U	0.5 U	0.5 U	0.0977 U
	Pentachlorophenol	1.0	NS	NS	<1.0	NS	NS	<0.20 UJv	<0.20	<0.40	<0.9	0.20 UJv	0.20 U	0.9 U/ *1.0 U	0.9 U/ *1.0 U	1.0 U	0.9 U	0.195 U
MW-13	Napthalene	0.17	NS	NS	<0.5	NS	NS	<5.0	<5.0	<5.0	<0.5	0.10 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.096 U/ *0.0958 U
	Pentachlorophenol	1.0	NS	NS	<1.0	NS	NS	<0.20 UJv	<0.20	<0.40 UJ	<0.9	0.20 UJv	0.20 U	0.9 U	1.0 U	0.9 U	0.9 U	0.192 U/ *0.192 U
MW-14	Napthalene	0.17	NS	<0.5	<0.5	NS	NS	<5.0	<5.0	<5.0	<0.5	0.10 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.0952 U
	Pentachlorophenol	1.0	NS	<1.0	<1.0	NS	NS	<0.20 UJv	<0.20	<0.40 UJ	<1.0	0.20 UJv	0.20 U	1.0 U	0.9 U	1.0 U	0.9 U	0.19 U

**NOTE:**

All concentrations are reported in units of µg/L.

All ground water samples were analyzed for SVOCs by a EPA Region 6 using CLP SOM02.3

**Bold, italicized** Entry indicates an exceedance of the MCL and/or RSL.

--- Well was not installed when sample was collected

< Indicates that the analyte was not detected above the sample quantitation limit shown.

J Estimated value

L Reported concentration is below contract-required quantitation limit

MCL EPA Maximum Contaminant Level ((EPA, May 2016)

µg/L Micrograms per liter

NS Well not sampled

P&A Monitoring well is plugged and abandoned

RSL EPA Regional Screening Level for Tap Water (EPA, May 2016)

<sup>1</sup>MW-15A was installed as a replacement well for MW-8A; this well was plugged and abandoned in October 2008 due to possibly being a conduit to overlying subsurface impact. Well ID and corresponding data are color coded for this well.

<sup>2</sup>MW-16A & 16B were installed to replace monitoring wells MW-10A and 10B, respectively after they were damaged during the initial in situ chemical oxidation pilot test. Well ID and corresponding data are color coded for these wells.

<sup>3</sup>MW-16B-R was installed as a replacement well for MW-16B after problems were reported for the well during the May 2010 LTRA sampling event. Well ID and corresponding data are color coded for this well.



**Table F-2: Soil Analytical Results**

(Source: 2017 Optimization Investigation Report)

**Analytical Data Summary for Soil Samples**

Well/Boring Location		MW-17A						Regional Screening Levels	
Sample ID		MW-17A-2-4		MW-17A-34-36		MW-17A-60-61			
Date		02/19/2017		02/19/2017		02/19/2017			
Depth (feet)		2-4		34-36		60-61			
Analyte	Units	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Industrial Soil (mg/kg)	Protection of Ground WaterRisk-based SSL (mg/kg)
Naphthalene	mg/kg	3.2	LJ	0.0021	U	0.026		17.00	0.00054
2-Methylnaphthalene	mg/kg	2.7	LJ	0.0021	U	0.0081		3000.00	0.19000
1,1'-Biphenyl	mg/kg	0.66		0.0021	U	0.0015	LJ	200.00	0.00870
Acenaphthylene	mg/kg	0.082	LJ	0.0021	U	0.21	U	NA	NA
Acenaphthene	mg/kg	5.3		0.21	U	0.21	U	45000.00	5.50000
Dibenzofuran	mg/kg	3.3	LJ	0.21	U	0.21	U	1000.00	0.15000
Fluorene	mg/kg	4.4		0.21	U	0.21	U	30000.00	5.40000
Pentachlorophenol	mg/kg	0.043		0.0041	U	0.0041	U	4.00	0.000057
Phenanthrene	mg/kg	20		0.21	U	0.21	U	NA	NA
Anthracene	mg/kg	2.2		0.21	U	0.21	U	230000.00	58.00000
Carbazole	mg/kg	0.34	LJ	0.4	UJ	0.41	UJ	NA	NA
Fluoranthene	mg/kg	11		0.4	U	0.41	U	30000.00	89.00000
Pyrene	mg/kg	6.4		0.21	U	0.21	U	23000.00	13.00000
Nitrobenzene	mg/kg	0.2	U	0.21	U	0.21	U	22.00	0.00009
Benzo(a)anthracene	mg/kg	1.6	J-	0.0021	U	0.0021	U	8000.00	0.08000
Chrysene	mg/kg	1.5	J-	0.21	U	0.21	U	290.00	1.20000
Benzo(b)fluoranthene	mg/kg	0.87		0.0021	U	0.0021	U	2.90	0.04100
Benzo(k)fluoranthene	mg/kg	0.32		0.0021	U	0.0021	U	29.00	0.40000
Benzo(a)pyrene	mg/kg	0.48		0.0021	U	0.0021	U	0.29	0.00400
Indeno(1,2,3-cd)pyrene	mg/kg	0.11	LJ	0.21	U	0.21	U	2.90	0.13000
Benzo(g,h,i)perylene	mg/kg	0.097	LJ	0.0021	U	0.21	U	NA	NA

Well/Boring Location		MW-17B						Regional Screening Levels	
Sample ID		MW-17B-4-6		MW-17B-4-6-FD		MW-17B-63-64			
Date		02/17/2017		02/17/2017		2/18/2017			
Depth (feet)		4-6		4-6		63-64			
Analyte	Units	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Industrial Soil (mg/kg)	Protection of Ground WaterRisk-based SSL (mg/kg)
Naphthalene	mg/kg	5		7.4		0.065		17.00	0.00054
2-Methylnaphthalene	mg/kg	3.1		5.1		0.016		3000.00	0.19000
1,1'-Biphenyl	mg/kg	0.67		1.2		0.0026		200.00	0.00870
Acenaphthylene	mg/kg	0.091	LJ	0.17	LJ	0.21	U	NA	NA
Acenaphthene	mg/kg	5.1		8.8		0.21	U	45000.00	5.50000
Dibenzofuran	mg/kg	3.5		6.3		0.21	U	1000.00	0.15000
Fluorene	mg/kg	3.8		7.1		0.21	U	30000.00	5.40000
Pentachlorophenol	mg/kg	0.076	LJ	0.12		0.0041	U	4.00	0.000057
Phenanthrene	mg/kg	22		40		0.21	U	NA	NA
Anthracene	mg/kg	1.4	J-	3.3	LJ	0.21	U	230000.00	58.00000
Carbazole	mg/kg	0.18	LJ	0.28	LJ	0.4	UJ	NA	NA
Fluoranthene	mg/kg	11		21		0.4	U	30000.00	89.00000
Pyrene	mg/kg	6.5		12		0.21	U	23000.00	13.00000
Benzo(a)anthracene	mg/kg	1.4	J-	2.7	J-	0.0021	U	2.90	0.00420
Chrysene	mg/kg	1.4	J-	2.6	J-	0.21	U	290.00	1.20000
Benzo(b)fluoranthene	mg/kg	0.73		1.8		0.0021	U	2.90	0.04100
Benzo(k)fluoranthene	mg/kg	0.29		0.58		0.0021	U	29.00	0.40000
Benzo(a)pyrene	mg/kg	0.35		0.72		0.0021	U	0.29	0.00400
Indeno(1,2,3-cd)pyrene	mg/kg	0.088	LJ	0.14	LJ	0.21	U	2.90	0.13000
Benzo(g,h,i)perylene	mg/kg	0.071	LJ	0.11	LJ	0.21	U	NA	NA



**Analytical Data Summary for Soil Samples**

Well/Boring Location		TASB-01		TASB-02				Regional Screening Levels	
Sample ID		TASB-01-39-40		TASB-02-6-8		TASB-02-39-40			
Date		02/19/2017		02/19/2017		02/19/2017			
Depth (feet)		39-40		6-8		39-40			
Analyte	Units	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Industrial Soil (mg/kg)	Protection of Ground Water Risk-based SSL (mg/kg)
N-Nitroso-di-n propylamine	mg/kg	0.22	U	0.99	U	0.023	LJ	0.33	0.00001
2-Nitroaniline	mg/kg	0.22	U	0.99	U	0.03	LJ	8000.00	0.08000
3-Nitroaniline	mg/kg	0.42	U	1.9	U	0.24	LJ	--	--
2,4-Dinitrophenol	mg/kg	0.42	U	1.9	U	0.024	LJ	1600.00	0.04400
4-Nitrophenol	mg/kg	0.42	U	1.9	U	0.06	LJ	--	--
Di-n-butylphthalate	mg/kg	0.22	U	0.99	U	0.024	LJ	82000.00	2.30000
Phenol	mg/kg	0.42	U	0.47	LJ	0.41	U	250000.00	3.30000
2-Methylphenol	mg/kg	0.42	U	0.46	LJ	0.41	U	41000.00	0.75000
3-Methylphenol + 4-Methylphenol	mg/kg	0.42	U	1	LJ	0.41	U	82000.00	1.50000
2,4-Dimethylphenol	mg/kg	0.22	U	0.34	LJ	0.21	U	16000.00	0.42000
Naphthalene	mg/kg	0.29		67		0.52		17.00	0.00054
2-Methylnaphthalene	mg/kg	0.11		36		0.15		3000.00	0.19000
1,1'-Biphenyl	mg/kg	0.03		9.8		0.028		200.00	0.00870
Acenaphthylene	mg/kg	0.22	U	0.83	LJ	0.21	U	--	--
Acenaphthene	mg/kg	0.086	LJ	46		0.21	U	45000.00	5.50000
Dibenzofuran	mg/kg	0.07	LJ	37		0.21	U	1000.00	0.15000
Fluorene	mg/kg	0.089	LJ	36		0.21	U	30000.00	5.40000
Pentachlorophenol	mg/kg	0.063		13		0.026		4.00	0.000057
Phenanthrene	mg/kg	0.52		180		0.086	LJ	--	--
Anthracene	mg/kg	0.056	LJ	20		0.21	U	230000.00	58.00000
Carbazole	mg/kg	0.42	UJ	7.8	J	0.41	UJ	--	--
Fluoranthene	mg/kg	0.36	LJ	72		0.032	LJ	30000.00	89.00000
Pyrene	mg/kg	0.24		39		0.024	LJ	23000.00	13.00000
Benzo(a)anthracene	mg/kg	0.093		8.8	J-	0.014		2.90	0.00420
Chrysene	mg/kg	0.054	LJ	8	J-	0.21	U	290.00	1.20000
Benzo(b)fluoranthene	mg/kg	0.034	LJ	4.1		0.0057		2.90	0.04100
Benzo(k)fluoranthene	mg/kg	0.02		1.5		0.0027		29.00	0.40000
Benzo(a)pyrene	mg/kg	0.029		2		0.0032		0.29	0.00400
Indeno(1,2,3-cd)pyrene	mg/kg	0.22	U	0.41	LJ	0.21	U	2.90	0.13000
Benzo(g,h,i)perylene	mg/kg	0.22	U	0.31	LJ	0.21	U	--	--
2,3,4,6-Tetrachlorophenol	mg/kg	0.22	U	0.65	LJ	0.21	U	25000.00	0.18000

**Analytical Data Summary for Soil Samples**

Well/Boring Location		MW-18A						Regional Screening Levels	
Sample ID		MW-18A-8-10		MW-18A-26-28		MW-18A-74-76			
Date		02/15/2017		02/15/2017		02/15/2017			
Depth (feet)		8-10		26-28		74-76			
Analyte	Units	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Industrial Soil (mg/kg)	Protection of Ground WaterRisk-based SSL (mg/kg)
No SVOC's were detected in soil samples collected from the MW-18A borehole									
Well/Boring Location		TASB-01						Regional Screening Levels	
Sample ID		TASB-01-8-10		TASB-01-22-24		TASB-01-22-24-FD			
Date		02/19/2017		02/19/2017		02/19/2017			
Depth (feet)		8-10		22-24		22-24			
Analyte	Units	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Industrial Soil (mg/kg)	Protection of Ground WaterRisk-based SSL (mg/kg)
2,4-Dimethylphenol	mg/kg	0.43	LJ	0.21	U	1.0	U	16000.00	0.42000
Naphthalene	mg/kg	110	J	23		160		17.00	0.00054
2-Methylnaphthalene	mg/kg	43	LJ	11		65		3000.00	0.19000
1,1'-Biphenyl	mg/kg	11		3.4	LJ	24	J	200.00	0.00870
Acenaphthylene	mg/kg	0.79	LJ	0.18	LJ	1.2	J-	--	--
Acenaphthene	mg/kg	69	J	18		81		45000.00	5.50000
Dibenzofuran	mg/kg	51	J	15		65		1000.00	0.15000
Fluorene	mg/kg	64	J	17		69		30000.00	5.40000
Pentachlorophenol	mg/kg	13		2.9		22		4.00	0.000057
Phenanthrene	mg/kg	220	J	79		290		--	--
Anthracene	mg/kg	24	LJ	6.9		32	LJ	230000.00	58.00000
Carbazole	mg/kg	9.7	J	3.5	J	31	J	--	--
Fluoranthene	mg/kg	100	J	33		150		30000.00	89.00000
Pyrene	mg/kg	57	J	19		70		23000.00	13.00000
Benzo(a)anthracene	mg/kg	13	J-	4.5	LJ	19	LJ	2.90	0.00420
Chrysene	mg/kg	12	J-	4	LJ	17	LJ	290.00	1.20000
Benzo(b)fluoranthene	mg/kg	6.2		2.5		18	J	2.90	0.04100
Benzo(k)fluoranthene	mg/kg	2.9		0.91		5.5		29.00	0.40000
Benzo(a)pyrene	mg/kg	3.4		1.1		8.1		0.29	0.00400
Indeno(1,2,3-cd)pyrene	mg/kg	0.72	LJ	0.17	LJ	0.97	LJ	2.90	0.13000
Benzo(g,h,i)perylene	mg/kg	0.62	LJ	0.14	LJ	1.3	LJ	--	--
2,3,4,6-Tetrachlorophenol	mg/kg	1.1	U	0.21	U	0.52	LJ	25000.00	0.18000



# Analytical Data Summary for Soil Samples

Well/Boring Location		TASB-03						Regional Screening Levels	
Sample ID		TASB-03-12-14		TASB-03-28-30		TASB-03-39-40			
Date		02/19/2017		02/19/2017		02/19/2017			
Depth (feet)		12-14		28-30		39-40			
Analyte	Units	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Industrial Soil (mg/kg)	Protection of Ground WaterRisk-based SSL (mg/kg)
Naphthalene	mg/kg	11	*	45		0.28		17.00	0.00054
2-Methylnaphthalene	mg/kg	6.1	*	25		0.024		3000.00	0.19000
1,1'-Biphenyl	mg/kg	1.6	*	6.9		0.005		200.00	0.00870
Acenaphthylene	mg/kg	0.14	*	0.25	LJ	0.21	U	--	--
Acenaphthene	mg/kg	8.3	*	34		0.21	U	45000.00	5.50000
Dibenzofuran	mg/kg	6.1	*	32		0.21	U	1000.00	0.15000
Fluorene	mg/kg	8.3	*	32		0.21	U	30000.00	5.40000
Pentachlorophenol	mg/kg	0.7		1.6	LJ	0.019		4.00	0.000057
Phenanthrene	mg/kg	27	*	150		0.095	LJ	--	--
Anthracene	mg/kg	3.9	*	14	J-	0.21	U	230000.00	58.00000
Carbazole	mg/kg	0.29	*	3.8	J-	0.4	UJ	--	--
Fluoranthene	mg/kg	15	*	67		0.052	LJ	30000.00	89.00000
Pyrene	mg/kg	7.8	*	36		0.033	LJ	23000.00	13.00000
Benzo(a)anthracene	mg/kg	2.3	*	8.3	J-	0.0058		2.90	0.00420
Chrysene	mg/kg	1.8	*	7	J-	0.21	U	290.00	1.20000
Benzo(b)fluoranthene	mg/kg	0.76	*	3.9		0.0024		2.90	0.04100
Benzo(k)fluoranthene	mg/kg	0.32		1.6		0.0011	LJ	29.00	0.40000
Benzo(a)pyrene	mg/kg	0.53		2.1		0.0012	LJ	0.29	0.00400
Indeno(1,2,3-cd)pyrene	mg/kg	0.11	*	0.34	LJ	0.21	U	2.90	0.13000
Benzo(g,h,i)perylene	mg/kg	0.089	*	0.28	LJ	0.21	U	--	--

## NOTE:

Only analytes detected in at least one sample are presented.

All concentrations are reported in units of mg/kg.

All samples were analyzed for SVOCs by a EPA Region 6 CLP Laboratory using CLP OLM04.2.

**Bold, italicized** Entry indicates an exceedance of an EPA RSL. **RSL highlighted red has been exceeded.**

-- No MCL and/or EPA RSL available

- Low biased. Actual concentration may be higher than the concentration reported.

\* Result not recommended for use because of associated QA/QC performance inferior to that from other analysis.

CLP Contracy Laboratory Program

EPA U.S. Environmental Protection Agency

FD Field Duplicate

J Estimated Value.

K The reported value may be biased high; the actual value is not expected to less than the reported value.

L Reported concentration is below contract-required quantitation limit.

mg/Kg Milligrams per kilogram

RSL EPA Regional Screening Level for tap water (EPA, May 2014)

SVOC Semivolatile organic compound

U Not detected at reported quantitation unit

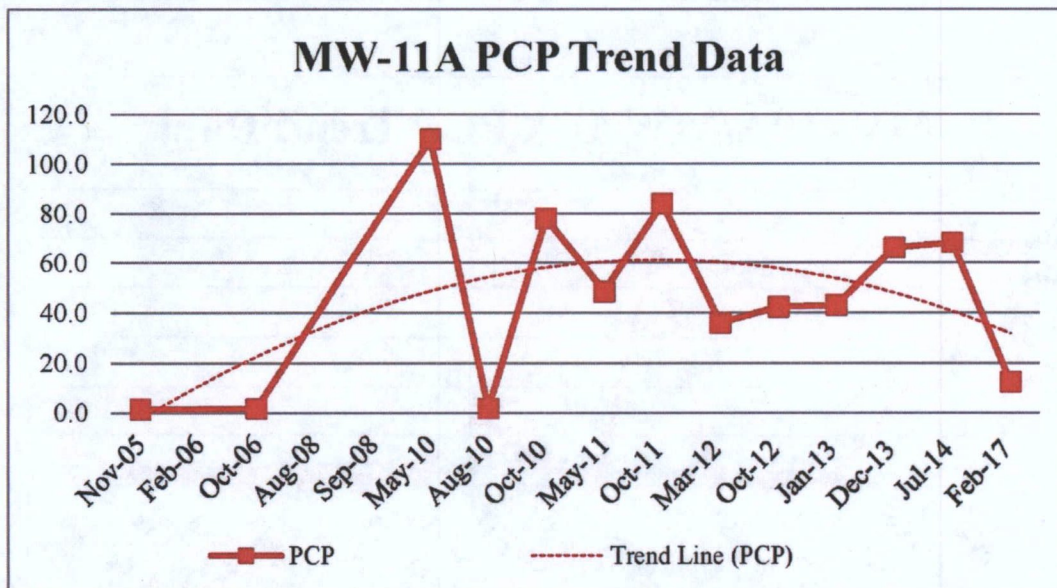
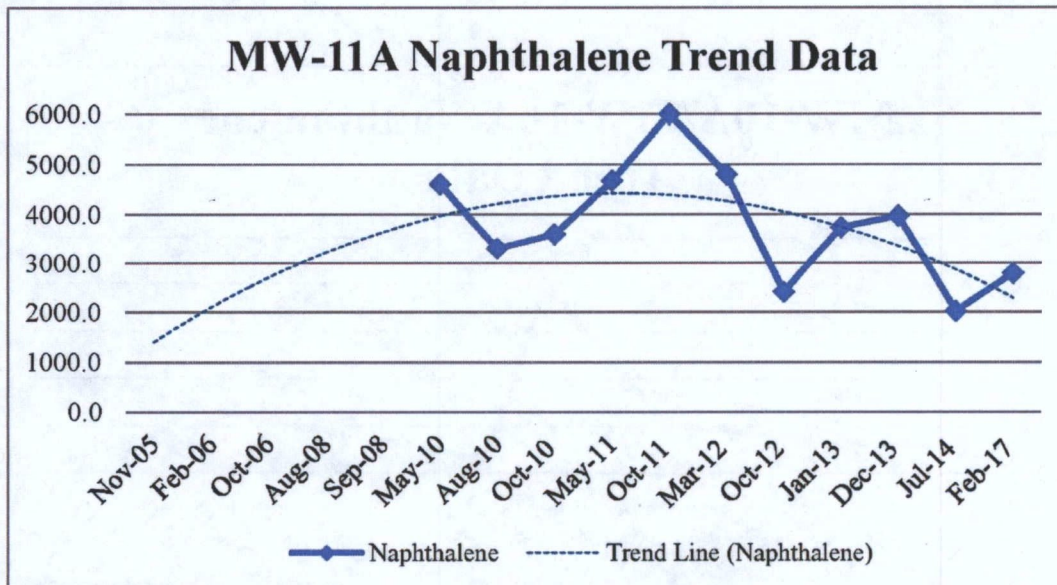


**Figure F-1: Monitoring Wells and Soil Borings Installed in 2017**  
 (Source: 2017 Optimization Investigation Report)



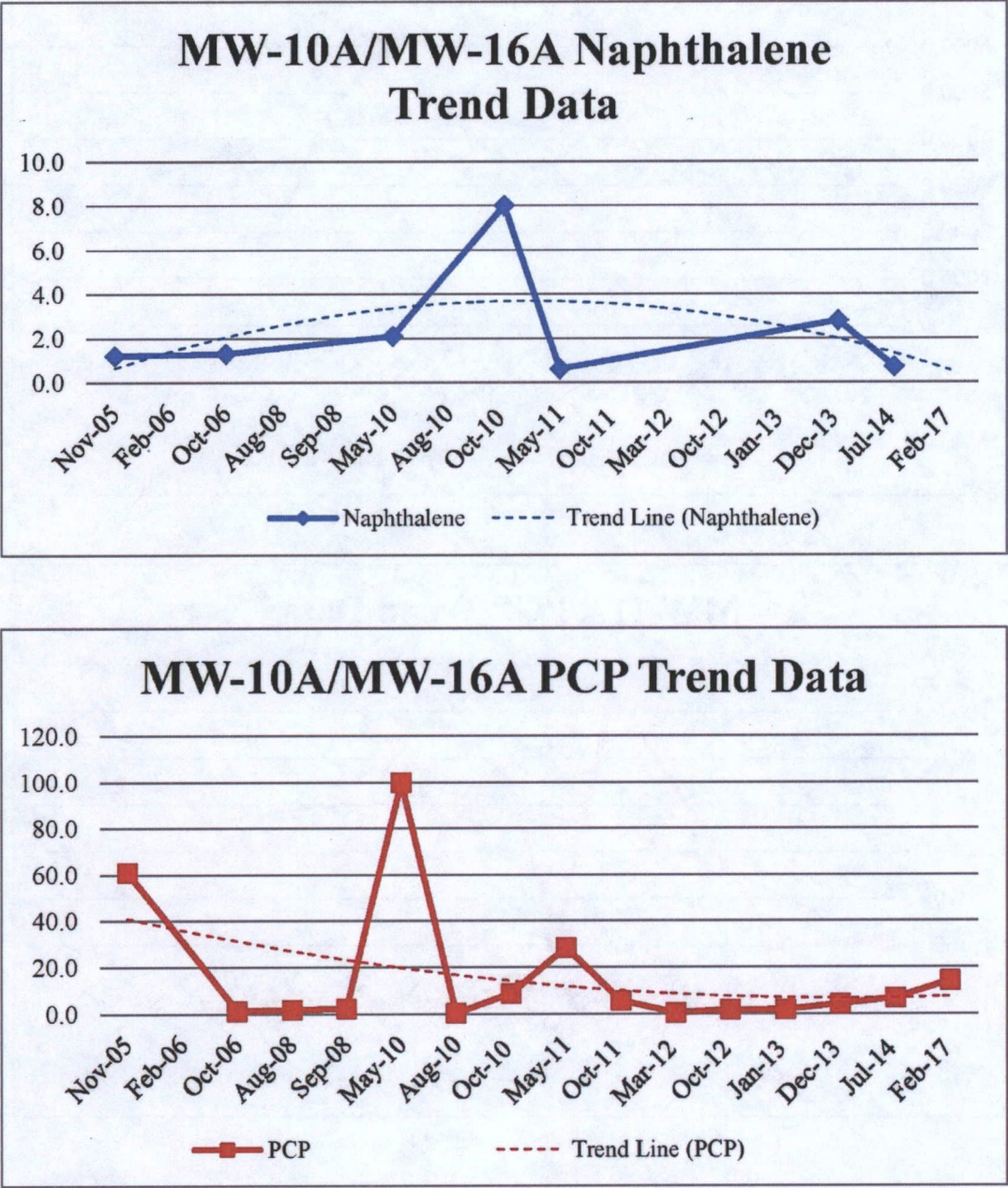


**Figure F-2: Time-Concentration Plots – MW-11A**  
 (Source: 2017 Optimization Investigation Report)





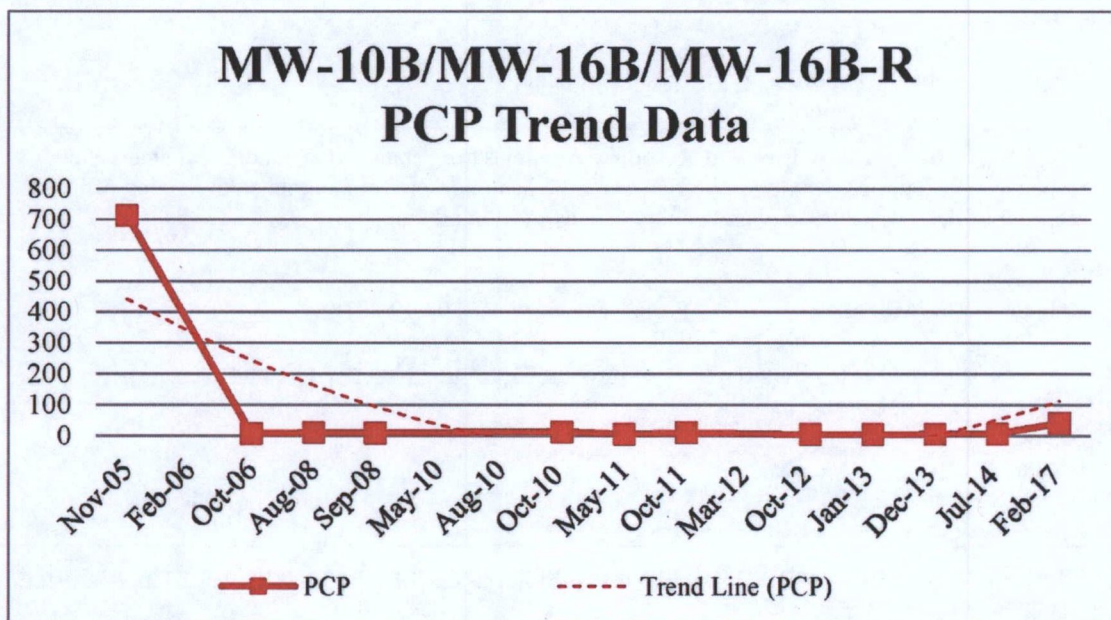
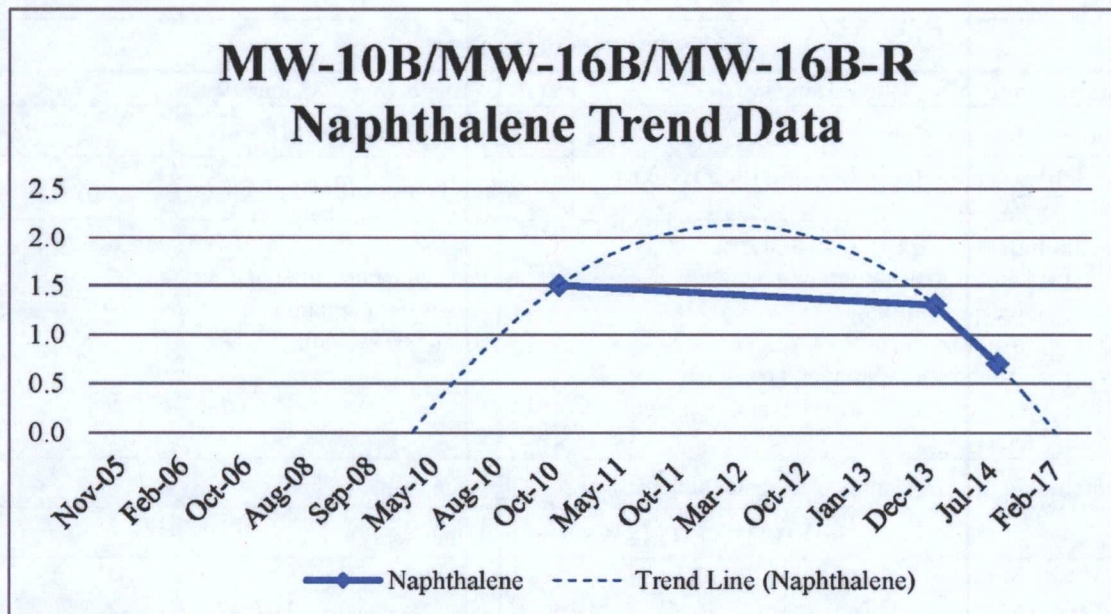
**Figure F-3: Time-Concentration Plots – MW-10A/MW-16A<sup>4</sup>**  
(Source: 2017 Optimization Investigation Report)



<sup>4</sup> MW-16A is a replacement well for MW-10A.



**Figure F-4: Time-Concentration Plots – MW-10B/MW-16B<sup>5</sup>**  
 (Source: 2017 Optimization Investigation Report)



<sup>5</sup> MW-16B-R is a replacement well for MW-16B, which was a replacement well for MW-10B.

## APPENDIX G – SITE INSPECTION CHECKLIST

## FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

## I. SITE INFORMATION

<b>Site Name:</b> Conroe Creosoting Company	<b>Date of Inspection:</b> October 19, 2017
<b>Location and Region:</b> Conroe, Texas; Region 6	<b>EPA ID:</b> TXD008091951
<b>Agency, Office or Company Leading the Five-Year Review:</b> EPA Region 6	<b>Weather/Temperature:</b> 80 degrees F, sunny
<b>Remedy Includes:</b> (Check all that apply) <div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Landfill cover/containment  <input type="checkbox"/> Access controls  <input checked="" type="checkbox"/> Institutional controls  <input type="checkbox"/> Groundwater pump and treatment  <input type="checkbox"/> Surface water collection and treatment  <input type="checkbox"/> Other: _____         </div> <div> <input checked="" type="checkbox"/> Monitored natural attenuation  <input type="checkbox"/> Groundwater containment  <input type="checkbox"/> Vertical barrier walls         </div> </div>	
<b>Attachments:</b> <input checked="" type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
<b>II. INTERVIEWS (check all that apply)</b>	
<b>1. O&amp;M Site Manager</b> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">           Name _____            Title _____            Date _____         </div> <div style="width: 45%;">           Phone: _____         </div> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Problems, suggestions <input type="checkbox"/> Report attached: _____	
<b>2. O&amp;M Staff</b> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">           Name _____            Title _____            Date _____         </div> <div style="width: 45%;">           Phone: _____         </div> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Problems/suggestions <input type="checkbox"/> Report attached: _____	
<b>3. Local Regulatory Authorities and Response Agencies</b> (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.	
Agency <u>TCEQ</u> <div style="display: flex; justify-content: space-between;"> <div>             Contact <u>Dee McCalley</u>              Name _____           </div> <div>             Project Manager <u>01/19/2018</u>              Title _____ Date _____ Phone No. _____           </div> </div> Problems/suggestions <input checked="" type="checkbox"/> Report attached: <u>Interview form included in Appendix E</u>	
Agency _____ <div style="display: flex; justify-content: space-between;"> <div>             Contact _____              Name _____           </div> <div>             Title _____ Date _____ Phone No. _____           </div> </div> Problems/suggestions <input type="checkbox"/> Report attached: _____	
<b>4. Other Interviews (optional)</b> <input checked="" type="checkbox"/> Report attached: <u>Interview form for property owner representative included in Appendix E</u>	

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)				
1.	<b>O&amp;M Documents</b>			
	<input checked="" type="checkbox"/> O&M manual	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> As-built drawings	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____				
2.	<b>Site-Specific Health and Safety Plan</b>		<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
	<input type="checkbox"/> Contingency plan/emergency response plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
3.	<b>O&amp;M and OSHA Training Records</b>		<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
Remarks: _____				
4.	<b>Permits and Service Agreements</b>			
	<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
5.	<b>Gas Generation Records</b>		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks: _____				
6.	<b>Settlement Monument Records</b>		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks: _____				
7.	<b>Groundwater Monitoring Records</b>		<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A
Remarks: _____				
8.	<b>Leachate Extraction Records</b>		<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
Remarks: _____				
9.	<b>Discharge Compliance Records</b>			
	<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
10.	<b>Daily Access/Security Logs</b>		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
Remarks: <u>The RCRA vault is surrounded by a fence with a locked gate.</u>				

IV. O&M COSTS																							
1.	<b>O&amp;M Organization</b> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> State in-house  <input type="checkbox"/> PRP in-house  <input type="checkbox"/> Federal facility in-house  <input checked="" type="checkbox"/> EPA RAC II contractor (LTRA groundwater monitoring activities) </div> <div> <input checked="" type="checkbox"/> Contractor for state (RCRA vault only)  <input type="checkbox"/> Contractor for PRP  <input type="checkbox"/> Contractor for Federal facility </div> </div>																						
2.	<b>O&amp;M Cost Records</b> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Up to date </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Funding mechanism/agreement in place <input type="checkbox"/> Unavailable </div> <p>Original O&amp;M cost estimate: _____ <input type="checkbox"/> Breakdown attached</p> <p style="text-align: center;">Total annual cost by year for review period if available</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">From: _____ Date</td> <td style="width: 25%;">To: _____ Date</td> <td style="width: 25%;">_____ Total cost</td> <td style="width: 25%; text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From: _____ Date</td> <td>To: _____ Date</td> <td>_____ Total cost</td> <td style="text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From: _____ Date</td> <td>To: _____ Date</td> <td>_____ Total cost</td> <td style="text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From: _____ Date</td> <td>To: _____ Date</td> <td>_____ Total cost</td> <td style="text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From: _____ Date</td> <td>To: _____ Date</td> <td>_____ Total cost</td> <td style="text-align: right;"><input type="checkbox"/> Breakdown attached</td> </tr> </table>			From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached	From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached	From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached	From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached	From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached																				
From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached																				
From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached																				
From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached																				
From: _____ Date	To: _____ Date	_____ Total cost	<input type="checkbox"/> Breakdown attached																				
3.	<b>Unanticipated or Unusually High O&amp;M Costs during Review Period</b> Describe costs and reasons: _____																						
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A																							
<b>A. Fencing</b>																							
1.	<b>Fencing Damaged</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Gates secured <input type="checkbox"/> N/A Remarks: <u>The RCRA vault is surrounded by a fence with a locked gate.</u>																						
<b>B. Other Access Restrictions</b>																							
1.	<b>Signs and Other Security Measures</b> <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A Remarks: <u>"No trespassing" signs are posted on the fence.</u>																						

**C. Institutional Controls (ICs)****1. Implementation and Enforcement**

Site conditions imply ICs not properly implemented

☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced

☐ Yes ☒ No ☐ N/AType of monitoring (e.g., self-reporting, drive by): during O&M and groundwater sampling eventsFrequency: semi-annualResponsible party/agency: TCEQ contractor (RCRA vault); EPA Remedial Action Contract (RAC) II contractor (monitoring well network)Contact Gary BaumgartenEPA RPM214-665-6749

Name

Title

Date

Phone no.

Reporting is up to date

☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency

☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met

☒ Yes ☐ No ☐ N/A

Violations have been reported

☐ Yes ☒ No ☐ N/AOther problems or suggestions: ☐ Report attached**2. Adequacy**☒ ICs are adequate☐ ICs are inadequate☐ N/A

Remarks: \_\_\_\_\_

**D. General****1. Vandalism/Trespassing**☐ Location shown on site map☒ No vandalism evident

Remarks: \_\_\_\_\_

**2. Land Use Changes On Site**☐ N/ARemarks: None. An industrial park is planned. A roadway through the Site is also under development.**3. Land Use Changes Off Site**☐ N/ARemarks: None.**VI. GENERAL SITE CONDITIONS****A. Roads**☒ Applicable☐ N/A**1. Roads Damaged**☐ Location shown on site map☒ Roads adequate☐ N/A

Remarks: \_\_\_\_\_

**B. Other Site Conditions**Remarks: An industrial park is being developed at the Site.**VII. LANDFILL COVERS**☒ Applicable☐ N/A**A. Landfill Surface****1. Settlement (low spots)**☐ Location shown on site map☒ Settlement not evident

Area extent: \_\_\_\_\_

Depth: \_\_\_\_\_

Remarks: \_\_\_\_\_

**2. Cracks**☐ Location shown on site map☒ Cracking not evident

Lengths: _____			Widths: _____			Depths: _____		
Remarks: _____								
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident					
Area extent: _____		Depth: _____						
Remarks: _____								
4.	<b>Holes</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Holes not evident					
Area extent: _____		Depth: _____						
Remarks: _____								
5.	<b>Vegetative Cover</b>	<input checked="" type="checkbox"/> Grass	<input checked="" type="checkbox"/> Cover properly established					
<input checked="" type="checkbox"/> No signs of stress		<input type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram)						
Remarks: _____								
6.	<b>Alternative Cover</b> (e.g., armored rock, concrete)						<input checked="" type="checkbox"/> N/A	
Remarks: _____								
7.	<b>Bulges</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Bulges not evident					
Area extent: _____		Height: _____						
Remarks: _____								
8.	<b>Wet Areas/Water Damage</b>	<input checked="" type="checkbox"/> Wet areas/water damage not evident						
<input type="checkbox"/> Wet areas		<input type="checkbox"/> Location shown on site map	Area extent: _____					
<input type="checkbox"/> Ponding		<input type="checkbox"/> Location shown on site map	Area extent: _____					
<input type="checkbox"/> Seeps		<input type="checkbox"/> Location shown on site map	Area extent: _____					
<input type="checkbox"/> Soft subgrade		<input type="checkbox"/> Location shown on site map	Area extent: _____					
Remarks: _____								
9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map					
<input checked="" type="checkbox"/> No evidence of slope instability								
Area extent: _____								
Remarks: _____								
<b>B. Benches</b>		<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A						
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)								
1.	<b>Flows Bypass Bench</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay					
Remarks: _____								
2.	<b>Bench Breached</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay					
Remarks: _____								
3.	<b>Bench Overtopped</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay					
Remarks: _____								



<b>C. Letdown Channels</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	<b>Settlement (Low spots)</b> <input type="checkbox"/> Location shown on site map Area extent: _____ Remarks: _____	<input checked="" type="checkbox"/> No evidence of settlement Depth: _____	
2.	<b>Material Degradation</b> <input type="checkbox"/> Location shown on site map Material type: _____ Remarks: _____	<input checked="" type="checkbox"/> No evidence of degradation Area extent: _____	
3.	<b>Erosion</b> <input type="checkbox"/> Location shown on site map Area extent: _____ Remarks: _____	<input checked="" type="checkbox"/> No evidence of erosion Depth: _____	
4.	<b>Undercutting</b> <input type="checkbox"/> Location shown on site map Area extent: _____ Remarks: _____	<input checked="" type="checkbox"/> No evidence of undercutting Depth: _____	
5.	<b>Obstructions</b> Type: _____ <input type="checkbox"/> Location shown on site map    Area extent: _____ Size: _____ Remarks: _____	<input checked="" type="checkbox"/> No obstructions	
6.	<b>Excessive Vegetative Growth</b> Type: _____ <input checked="" type="checkbox"/> No evidence of excessive growth <input checked="" type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map    Area extent: _____ Remarks: _____		
<b>D. Cover Penetrations</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Gas Vents</b> <input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____		
2.	<b>Gas Monitoring Probes</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____		
3.	<b>Monitoring Wells (within surface area of landfill)</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A		

Remarks: _____			
4.	<b>Extraction Wells</b>	<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A	Remarks: _____
5.	<b>Settlement Monuments</b>	<input type="checkbox"/> Located <input type="checkbox"/> Routinely surveyed <input checked="" type="checkbox"/> N/A	Remarks: _____
<b>E. Gas Collection and Treatment</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Gas Treatment Facilities</b>	<input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance	Remarks: _____
2.	<b>Gas Collection Wells, Manifolds and Piping</b>	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance	Remarks: _____
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings)	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A	Remarks: _____
<b>F. Cover Drainage Layer</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Outlet Pipes Inspected</b>	<input type="checkbox"/> Functioning <input type="checkbox"/> N/A	Remarks: _____
2.	<b>Outlet Rock Inspected</b>	<input type="checkbox"/> Functioning <input type="checkbox"/> N/A	Remarks: _____
<b>G. Detention/Sedimentation Ponds</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Siltation</b> Area extent: _____      Depth: _____	<input type="checkbox"/> N/A	Remarks: _____
	<input type="checkbox"/> Siltation not evident		
2.	<b>Erosion</b> Area extent: _____      Depth: _____		Remarks: _____
	<input type="checkbox"/> Erosion not evident		
3.	<b>Outlet Works</b>	<input type="checkbox"/> Functioning <input type="checkbox"/> N/A	Remarks: _____
4.	<b>Dam</b>	<input type="checkbox"/> Functioning <input type="checkbox"/> N/A	Remarks: _____
<b>H. Retaining Walls</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Deformations</b>	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Deformation not evident	

Horizontal displacement: _____		Vertical displacement: _____	
Rotational displacement: _____			
Remarks: _____			
2.	<b>Degradation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks: _____			
<b>I. Perimeter Ditches/Off-Site Discharge</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Siltation</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Siltation not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2.	<b>Vegetative Growth</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Vegetation does not impede flow			
Area extent: _____		Type: _____	
Remarks: _____			
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident
Area extent: _____		Depth: _____	
Remarks: _____			
4.	<b>Discharge Structure</b>	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks: <u>The RCRA vault cap is designed to allow surface runoff to flow off the cap by the letdown structures, and then flow across to adjacent portions of the property surface surrounding the vault. No signs of ponding/erosion were noted with the discharge structure.</u>			
<b>VIII. VERTICAL BARRIER WALLS</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2.	<b>Performance Monitoring</b>	Type of monitoring: _____	
<input type="checkbox"/> Performance not monitored			
Frequency: _____		<input type="checkbox"/> Evidence of breaching	
Head differential: _____			
Remarks: _____			
<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
<b>A. Groundwater Extraction Wells, Pumps and Pipelines</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Pumps, Wellhead Plumbing and Electrical</b>		
<input type="checkbox"/> Good condition		<input type="checkbox"/> All required wells properly operating	<input type="checkbox"/> Needs maintenance
<input type="checkbox"/> N/A			
Remarks: _____			
2.	<b>Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances</b>		
<input type="checkbox"/> Good condition		<input type="checkbox"/> Needs maintenance	
Remarks: _____			

<b>3.</b>	<b>Spare Parts and Equipment</b>	<input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided	Remarks: _____
<b>B. Surface Water Collection Structures, Pumps and Pipelines</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Collection Structures, Pumps and Electrical</b>	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance	Remarks: _____
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances</b>	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance	Remarks: _____
3.	<b>Spare Parts and Equipment</b>	<input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided	Remarks: _____
<b>C. Treatment System</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Treatment Train (check components that apply)</b> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"><input type="checkbox"/> Metals removal</div> <div style="width: 33%;"><input type="checkbox"/> Oil/water separation</div> <div style="width: 33%;"><input type="checkbox"/> Bioremediation</div> <div style="width: 33%;"><input type="checkbox"/> Air stripping</div> <div style="width: 33%;"><input type="checkbox"/> Carbon adsorbers</div> <div style="width: 33%;"><input type="checkbox"/> Filters: _____</div> <div style="width: 33%;"><input type="checkbox"/> Additive (e.g., chelation agent, flocculent): _____</div> <div style="width: 33%;"><input type="checkbox"/> Others: _____</div> <div style="width: 33%;"><input type="checkbox"/> Good condition</div> <div style="width: 33%;"><input type="checkbox"/> Needs maintenance</div> <div style="width: 33%;"><input type="checkbox"/> Sampling ports properly marked and functional</div> <div style="width: 33%;"><input type="checkbox"/> Sampling/maintenance log displayed and up to date</div> <div style="width: 33%;"><input type="checkbox"/> Equipment properly identified</div> <div style="width: 33%;"><input type="checkbox"/> Quantity of groundwater treated annually: _____</div> <div style="width: 33%;"><input type="checkbox"/> Quantity of surface water treated annually: _____</div> </div> Remarks: _____		
2.	<b>Electrical Enclosures and Panels (properly rated and functional)</b> <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs maintenance Remarks: _____		
4.	<b>Discharge Structure and Appurtenances</b> <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____		

<b>5.</b>	<b>Treatment Building(s)</b>	<input type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks: _____
<b>6.</b>	<b>Monitoring Wells (pump and treatment remedy)</b>	<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: _____
<b>D. Monitoring Data</b>		
<b>1.</b>	<b>Monitoring Data</b>	<input type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality
<b>2.</b>	<b>Monitoring Data Suggests:</b>	<input checked="" type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining
<b>E. Monitored Natural Attenuation</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
<b>1.</b>	<b>Monitoring Wells (natural attenuation remedy)</b>	<input type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: <u>Several of the well monuments used to protect/secure the wells were observed to contain locks, but the locks had not been re-secured since the previous groundwater monitoring event, which occurred in January 2013. Closer inspection of these wells indicated the well caps were still secure, with no indication of tampering or vandalism.</u>
<b>X. OTHER REMEDIES</b>		
If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.		
<b>XI. OVERALL OBSERVATIONS</b>		
<b>A.</b>	<b>Implementation of the Remedy</b>	
	Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The remedy includes MNA for groundwater contamination, no further action for on-site soils and off-site sediments, long-term O&amp;M for the RCRA vault, and institutional controls to restrict site use and maintain the integrity of the remedy. The remedy is effective and functioning as designed. Groundwater contamination is limited in extent and remains within the site boundary. Overall, COC concentrations in groundwater are decreasing. Institutional controls are in place. An old on-site production supply well should be abandoned.</u>	
<b>B.</b>	<b>Adequacy of O&amp;M</b>	
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>The LTRA groundwater monitoring schedule is currently adequate. TCEQ plans to sample the new RCRA monitoring wells in fiscal year 2018. TCEQ should update the landfill O&amp;M plan to address the groundwater monitoring.</u>	
<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>	
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>None at this time.</u>	
<b>D.</b>	<b>Opportunities for Optimization</b>	

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.  
None at this time. EPA recently completed an Optimization Investigation in June 2017. No further optimization activities were recommended.

**Site Inspection Participants:**

Gary Baumgarten, EPA

Dee McCalley, TCEQ

Matt Marquis, property manager

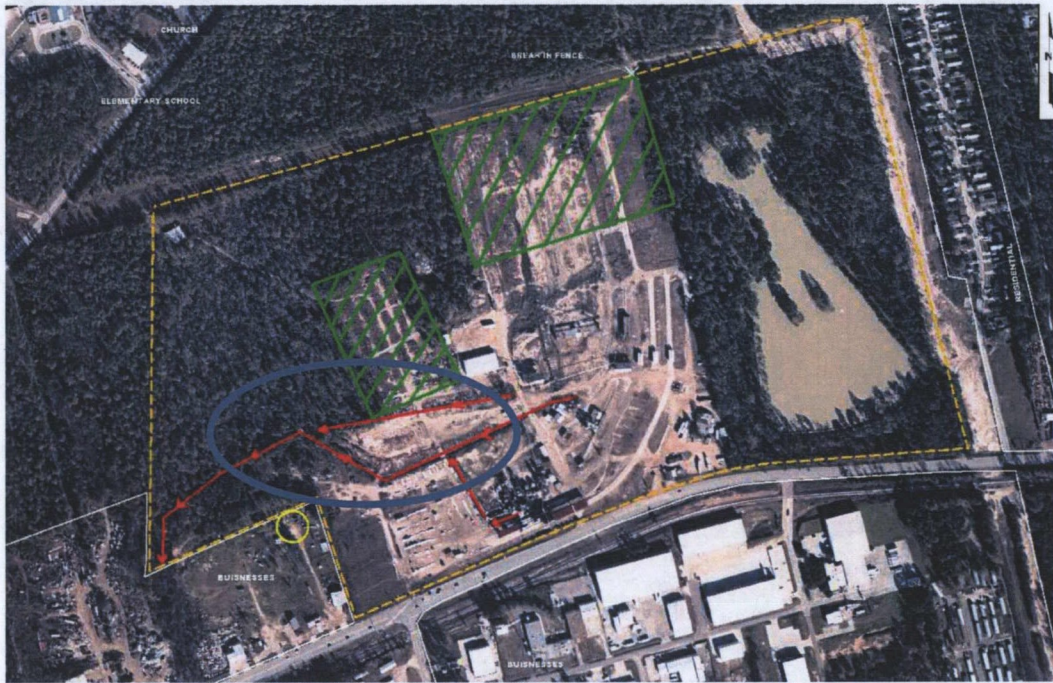
Ryan Burdge, Skeo

Kelly MacDonald, Skeo



## APPENDIX H – REMOVAL ACTION AND SITE INSPECTION PHOTOS

### *BEFORE – Removal Action Photos*



Aerial photograph of the Site prior to the 2002 TCRA



Construction of the RCRA vault





View of the Site, facing north



View of the Site and access road, facing northeast





View of southern part of Site, facing west



Monitoring well MW-8B





Monitoring well MW-17A



Possible location of proposed new road across the Site, facing south





Monitoring wells MW-12, MW-5A and MW-5B



Entry gate, fence and sign for the RCRA vault area





"No trespassing" sign on fence around the RCRA vault area



Sampling port for leachate in the RCRA vault area





Vegetation on top of the RCRA vault



Vegetation on top of the RCRA vault





Fence along the north side of the RCRA vault area



Stormwater drainage riprap on side of the RCRA vault area



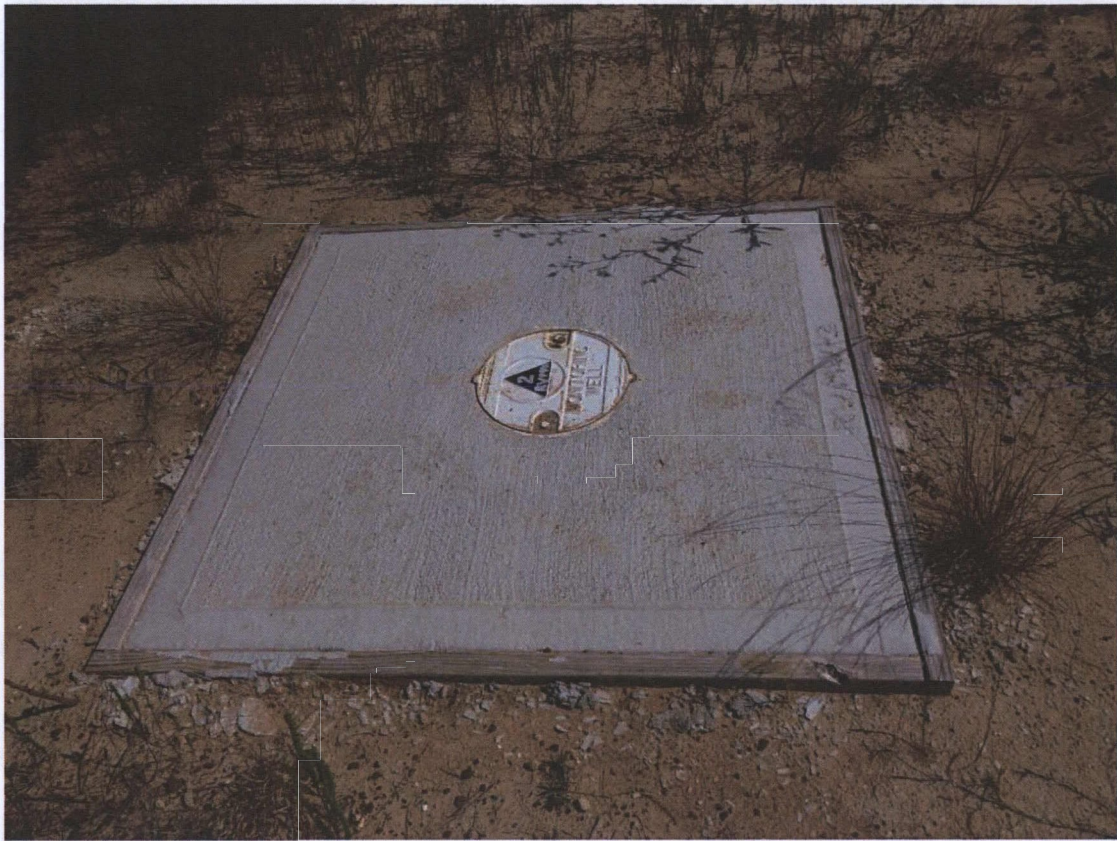


Rusted lock around the RCRA vault area



“No trespassing” sign on fence around the RCRA vault area





RCRA vault monitoring well RVMW-2



# APPENDIX I – VAPOR INTRUSION SCREENING-LEVEL RISK EVALUATION

Table I-1: VISL Screening Evaluation, MW-11A

## OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.5, June 2017 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (°C)	Tgw	22.49	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration (C <sub>gw</sub> ) (ug/L)	Calculated Indoor Air Concentration (C <sub>ia</sub> ) (ug/m <sup>3</sup> )	VI Carcinogenic Risk CR	VI Hazard HQ
x 56-55-3	Benz[ <i>a</i> ]anthracene	1.1E+01	5.20E-03	2.5E-08	No RfC
x 92-52-4	Biphenyl, 1,1'-	3.9E+01	4.94E-01	No IUR	2.8E-01
x 91-20-3	Naphthalene	2.8E+03	4.18E+01	1.2E-04	3.2E+00

Inhalation Unit Risk IUR (ug/m <sup>3</sup> ) <sup>-1</sup>	IUR Source*	Reference Concentration RfC (mg/m <sup>3</sup> )	RfC Source*	Mutagenic Indicator
6.00E-05	E	4.00E-04	X	Mut
3.40E-05	CA	3.00E-03	I	

### Notes:

#### (1) Inhalation Pathway Exposure Parameters (RME):

Exposure Scenario	Units
Averaging time for carcinogens	(yrs)
Averaging time for non-carcinogens	(yrs)
Exposure duration	(yrs)
Exposure frequency	(days/yr)
Exposure time	(hr/day)

Residential		Commercial		Selected (based on scenario)	
Symbol	Value	Symbol	Value	Symbol	Value
ATc_R_GW	70	ATc_C_GW	70	ATc_GW	70
ATnc_R_GW	28	ATnc_C_GW	25	ATnc_GW	25
ED_R_GW	28	ED_C_GW	25	ED_GW	25
EF_R_GW	350	EF_C_GW	250	EF_GW	250
ET_R_GW	24	ET_C_GW	8	ET_GW	8

#### (2) Generic Attenuation Factors:

Source Medium of Vapors	Units
Groundwater	(-)
Sub-Slab and Exterior Soil Gas	(-)

Formulas  
 $C_{ia} = \min(C_{ia,c}, C_{ia,n})$   
 $C_{ia,c} (ug/m^3) = TCR \times ATc \times (365 \text{ days/yr}) \times (24 \text{ hrs/day}) / (ED \times EF \times ET \times IUR)$   
 $C_{ia,n} (ug/m^3) = THQ \times ATnc \times (365 \text{ days/yr}) \times (24 \text{ hrs/day}) \times RfC \times (1000 \text{ ug/mg}) / (ED \times EF \times ET)$

Residential		Commercial		Selected (based on scenario)	
Symbol	Value	Symbol	Value	Symbol	Value
AFgw_R_GW	0.001	AFgw_C_GW	0.001	AFgw_GW	0.001
AFss_R_GW	0.03	AFss_C_GW	0.03	AFss_GW	0.03

#### (3) Special Case Chemicals

Trichloroethylene	Residential	Commercial	Selected (based on scenario)
	Symbol Value	Symbol Value	Symbol Value
	mIURTCR_R_GW 1.00E-06	mIURTCR_C_GW 0.00E+00	mIURTCR_GW 0.00E+00
	IURTCR_R_GW 3.10E-06	IURTCR_C_GW 4.10E-06	IURTCR_GW 4.10E-06

#### Mutagenic Chemicals

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below.

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor

25

This factor is used in the equations for mutagenic chemicals.

#### Vinyl Chloride

See the Navigation Guide equation for C<sub>ia,c</sub> for vinyl chloride.

### Notation:

I = IRIS, EPA Integrated Risk Information System (IRIS). Available online at <http://www.epa.gov/iris/subst/index.html>  
P = PPRTV, EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at <http://hhprrtv.cerl.gov/pprtv.shtml>  
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at <http://www.atsdr.cdc.gov/mrls/index.html>  
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at <http://www.oehha.ca.gov/risk/ChemicalCD/index.asp>  
H = HEAST, EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at <http://epa-heast.cerl.gov/heast.shtml>  
S = See RSL User Guide, Section 5  
X = PPRTV Appendix  
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).  
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).  
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).  
Yellow highlighting indicates site-specific parameters that may be edited by the user.  
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.  
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).